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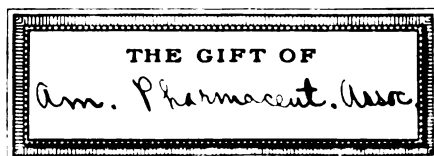
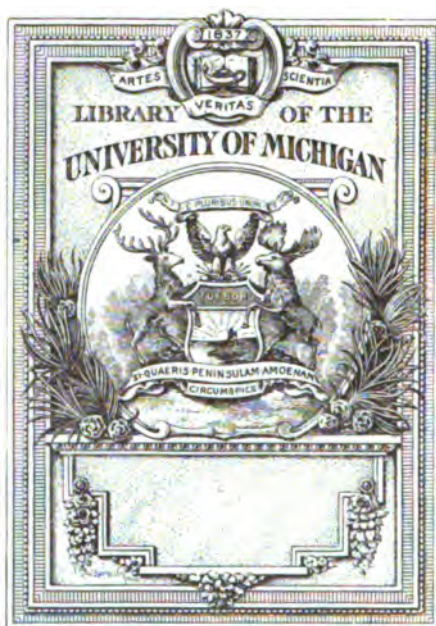
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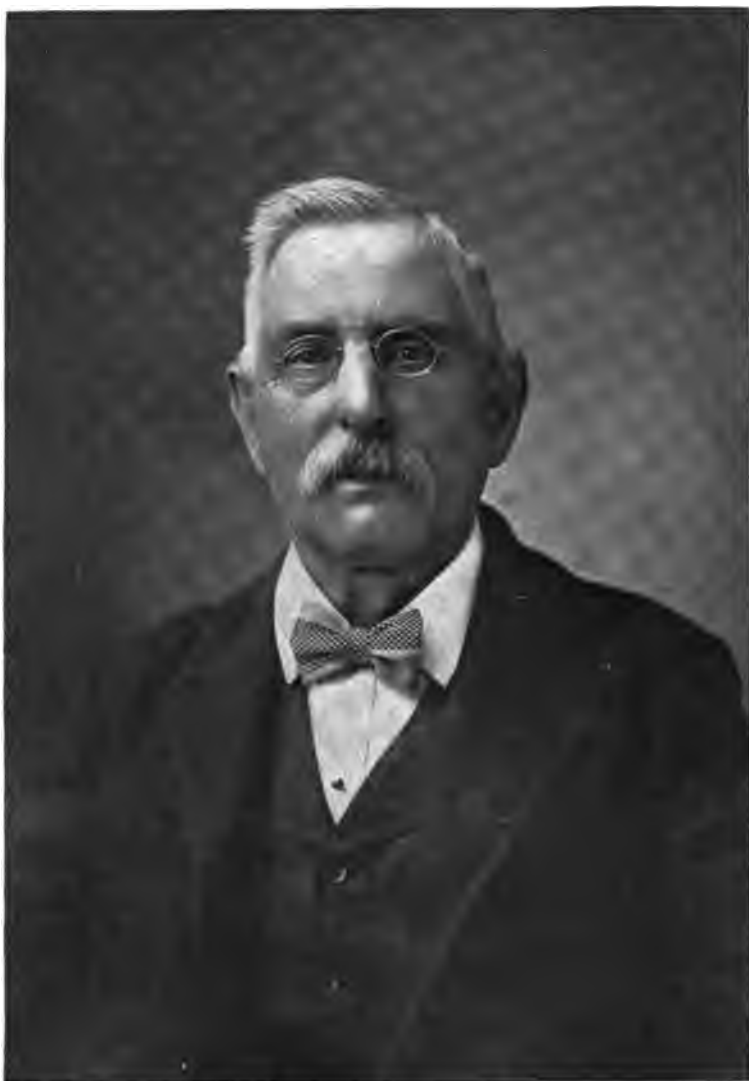
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CHEA

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A



PHILIP CHARLES CANDIDUS

Born at Fischbach, Germany, June 17, 1837. Died at Mobile, Ala., March 6, 1910. Joined the American Pharmaceutical Association and became a life member in 1896. Served as First Vice-President 1904-1905, and as Second Vice-President 1879-1880, and was elected Honorary President in 1907.



WILLIAM MARTIN SEARBY

Born in England, January 21, 1835. Died at San Francisco, Cal., October 7, 1909.

Joined the American Pharmaceutical Association in 1882. Was elected President in 1907, and served as First Vice-President 1901-1902, as Second Vice-President 1889-1890, and as Chairman of the Council 1908-1909.

PROCEEDINGS
OF THE
AMERICAN
PHARMACEUTICAL ASSOCIATION
AT THE
FIFTY-EIGHTH ANNUAL MEETING

HELD AT
RICHMOND, VA., MAY, 1910.

ALSO THE
CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

BALTIMORE:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1910.



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1910-1911.

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REPORTER ON THE PROGRESS OF PHARMACY.

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EDITOR OF THE BULLETIN.

JOSEPH W. ENGLAND. Philadelphia, Pa.

LOCAL SECRETARY.

C. HERBERT PACKARD Boston, Mass.

OFFICERS-ELECT FOR 1911-1912.

In accordance with the requirements of Chapter I of the By-Laws, an election for four officers of the Association and three members of the Council, for the year 1911-1912, was held by mail during the months of August and September, 1910, and as shown by the report of the Board of Canvassers, hereto attached, the following candidates have received a plurality of the votes cast and are therefore declared elected, the installation to take place at the next annual meeting at Boston, Mass., in August, 1911:

President—JOHN G. GODDING, of Boston, Mass.

First Vice-President—WILHELM BODEMANN, of Chicago, Ill.

Second Vice-President—CHAS. M. FORD, of Denver, Colo.

Third Vice-President—ERNEST BERGER, of Tampa, Fla.

Members of the Council—EUGENE G. EBERLE, of Dallas, Tex.; JAMES M. GOOD, of St. Louis, Mo.; GEORGE F. PAYNE, of Atlanta, Ga.

CHAS. CASPARI, JR., *General Secretary*.

BALTIMORE, November 5, 1910.

REPORT OF THE BOARD OF CANVASSERS.

SAN FRANCISCO, CAL., Oct. 28, 1910.

CHARLES CASPARI, JR., *General Secretary*.

Having been appointed by President E. G. Eberle to act as a Board of Canvassers to examine and count the ballots cast for officers of the A. Ph. A. and members of the Council for 1911-1912, we the undersigned have the honor to submit below a tabulated record showing the result of the canvass of said ballots.

The total number of ballots received was 1002. Of this number one was a written ballot and six of the regular ballots were entirely unmarked; your Committee, therefore, deemed it proper not to include these seven ballots in the count, nor would they have made any material difference in the result had they been counted.

SUMMARY OF BALLOTS COUNTED.

For President	{	John G. Godding	received 635 votes
		Fabius C. Godbold	" 162 "
		T. Ashby Miller	" 98 "
For First Vice-President	{	Wilhelm Bodemann	" 516 "
		Wm. A. Frost	" 252 "
		George C. Blakeley	" 118 "
For Second Vice-President	{	Chas. M. Ford	" 406 "
		F. W. Meissner, Jr.	" 302 "
		Fred. A. Hubbard	" 177 "
For Third Vice-President.....	{	Ernest Berger	" 387 "
		Chas. Holzhauser	" 304 "
		James O. Burge	" 191 "
		Eugene G. Eberle	" 624 "
		James M. Good	" 500 "
		George F. Payne	" 322 "
Members of the Council	{	Otto Raubenheimer	" 308 "
		Erich H. Ladish	" 260 "
		Albert M. Roehrig	" 214 "
		Theo. D. Wetterstroem	" 176 "
		Edward C. Bent	" 128 "
		Mathias Noll	" 99 "

Respectfully submitted,

CHAS. B. WHILDEN, *Chairman*,
FRANK T. GREEN,
JOHN H. FLINT.

COUNCIL.

Term Expires.

MEMBERS OF THE COUNCIL.

- | | | |
|-------|------------------------------------|--------------------------------|
| 1911. | THE OFFICERS OF THE ASSOCIATION, | } <i>Ex-officio.</i> |
| " | THE CHAIRMEN OF THE FIVE SECTIONS, | |
| " | THE SECRETARY OF THE COUNCIL, | |
| " | THE HISTORIAN OF THE ASSOCIATION, | |
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| " | MURRAY G. MOTTER | Washington Branch A. Ph. A. |
| " | JULIUS A. KOCH | Pittsburg Branch A. Ph. A. |
| " | LEWIS C. HOPP | Northern Ohio Branch A. Ph. A. |
| " | ALFRED W. CLARK | Denver Branch A. Ph. A. |
| " | PHILIP ASHER | New Orleans Branch A. Ph. A. |
| 1912. | OSCAR OLDBERG..... | Chicago, Ill. |
| " | CHAS. E. CASPARI | St. Louis, Mo. |
| " | GEORGE M. BERINGER..... | Camden, N. J. |
| " | AMBROSE HUNSBERGER..... | Philadelphia Branch A. Ph. A. |
| " | JOHN B. THOMAS | Baltimore Branch A. Ph. A. |
| " | GEORGE H. HITCHCOCK | New York Branch A. Ph. A. |
| " | FREDERICK J. WULLING | Northwestern Branch A. Ph. A. |
| " | CHAS. A. STORER..... | Chicago Branch A. Ph. A. |
| 1913. | JAS. H. BEAL | Scio, O. |
| " | JOS. P. REMINGTON | Philadelphia, Pa. |
| " | HENRY H. RUSBY | Newark, N. J. |
| " | WILLIAM R. WHITE | Nashville Branch A. Ph. A. |

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JAMES H. BEAL, Chairman.

HENRY H. RUSBY, Vice-Chairman.

JOSEPH W. ENGLAND, Secretary.

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PHILIP ASHER,
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CHAS. W. JOHNSON,
CHAS. E. CASPARI,
J. W. ENGLAND, *Secretary*.
THE TREASURER AND GENERAL SEC-
RETARY OF THE ASSOCIATION, *ex-*
officio.

On Publication :

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*C. S. N. HALLBERG,
M. I. WILBERT,
*LEO ELIEL.

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CHAS. CASPARI, JR.

On Finance :

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Auditing Committee: (Appointed by the Chairman of the Council.)

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OTTO F. CLAUS,
SOLOMON BOEHM.

* Deceased.

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(Appointed by the President.)

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H. A. B. DUNNING (for 2 years).	L. D. HAVENHILL (for 7 years).
CHAS. E. CASPARI (for 3 years).	L. F. KEBLER (for 8 years).
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 THOMAS P. COOK, New York, N. Y. (for 2 years).
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 HENRY M. WHELPLEY, (*ex-officio*.)

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(Elected by the Council.)

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FOR THE TERM OF ONE YEAR.

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 HENRY H. RUSBY, Newark, N. J. JNO. M. FRANCIS, Detroit, Mich.

* Deceased.

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WILLIS G. GREGORY, Buffalo, N. Y. (for 7 years).
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 HARRY B. MASON, Detroit, Mich. (for 4 years).
 EUGENE G. EBERLE, Dallas, Tex. (for 3 years).
 CHAS. CASPARI, JR., Baltimore, Md. (for 2 years).
 HENRY L. TAYLOR, Albany, N. Y. (for 1 year).

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 CHAS. W. JOHNSON, Seattle, Wash. VALENTINE SCHMIDT, San Francisco, Cal.
 CORNELIUS OSSEWARD, Seattle, Wash. JOHN H. FLINT, San Francisco, Cal.
 CHAS. B. WHILDEN, San Francisco, Cal. J. M. A. LAUE, Portland, Ore.
 HOWARD A. PEARS, Los Angeles, Cal. THOS. P. COOK, New York, N. Y.
 G. H. P. LICHTHARDT, Sacramento, Cal.

DELEGATES TO THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

JULIUS A. KOCH (Chairman) Pittsburg, Pa.
 ERNEST BERGER, Tampa, Fla. F. W. MEISSNER, JR., La Porte, Ind.
 WILHELM BODEMANN, Chicago, Ill. LOUIS EMANUEL, Pittsburg, Pa.

DELEGATES TO THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

A. B. LYONS, (Chairman) Detroit, Mich.
 MILTON H. HICKOX, Dallas, Tex. R. H. WALKER, Gonzales, Tex.
 H. L. CARLETON, Austin, Tex. GEO. B. KAUFFMAN, Columbus, O.

*Deceased.

LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.
(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa.....	<i>Daniel B. Smith</i> , Philadelphia.	<i>George W. Andrews</i> , Baltimore.	<i>Samuel M. Colcord</i> , Boston.	<i>C. Augustus Smith</i> , Cincinnati.
Aug. 24, 1853..	Boston, Mass.....	<i>William A. Brewer</i> , Boston.	<i>George D. Coggeshall</i> , New York.	<i>Alexander Duval</i> , Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.....	<i>William B. Chapman</i> , Cincinnati.	<i>Henry T. Cummings</i> , Portland, Me.	<i>John Meakin</i> , New York.	<i>Joseph Laidley</i> , Richmond, Va.
Sept. 11, 1855..	New York, N. Y.....	<i>John Meakin</i> , New York.	Charles B. Guthrie, Memphis, Tenn.	<i>Charles Ellis</i> , Philadelphia.	<i>Henry F. Fish</i> , Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md.....	<i>George W. Andrews</i> , Baltimore.	<i>John L. Kidwell</i> , Washington, D. C.	<i>Frederick Stearns</i> , Detroit, Mich.	<i>Henry T. Kiersted</i> , New York.
Sept. 8, 1857..	Philadelphia, Pa.....	<i>Charles Ellis</i> , Philadelphia.	<i>James Cooke</i> , Fredericksburg, Va.	<i>Samuel P. Peck</i> , Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C....	<i>John L. Kidwell</i> , Georgetown, D. C.	<i>Edward R. Squibb</i> , Brooklyn, N. Y.	<i>James O'Gallagher</i> , St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.....	<i>Samuel M. Colcord</i> , Boston.	<i>William Procter, Jr.</i> , Philadelphia.	<i>Joseph Roberts</i> , Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y.....	<i>Henry T. Kiersted</i> , New York.	<i>William J. M. Gordon</i> , Cincinnati.	<i>William S. Thompson</i> , Baltimore.	<i>Theodore Metcalf</i> , Boston.
Aug. 27, 1862..	Philadelphia, Pa.....	<i>Wm. Procter, Jr.</i> , Philadelphia.	<i>John Milkan</i> , New York.	<i>Eugene L. Massol</i> , St. Louis.	<i>J. Faris Moore</i> , Baltimore.
Sept. 8, 1863..	Baltimore, Md.....	<i>J. Faris Moore</i> , Baltimore.	<i>John M. Maisch</i> , Philadelphia.	<i>Chas. A. Twiss</i> , Dover, N. H.	<i>George W. Weyman</i> , Pittsburg.
Sept. 21, 1864..	Cincinnati, O.....	<i>William J. M. Gordon</i> , Cincinnati.	<i>Richard H. Stabler</i> , Alexandria.	Enno Sander, St. Louis.	<i>Thomas Hollis</i> , Boston.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865...	Boston, Mass.....	<i>Henry W. Lincoln</i> , Boston.	<i>George C. Close</i> , Brooklyn, N. Y.	<i>Elijah W. Sackrider</i> , Cleveland, O.	<i>Charles A. Heinisch</i> , Lancaster, Pa.
Aug. 22, 1866...	Detroit, Mich.....	<i>Frederick Stearns</i> , Detroit, Mich.	<i>Edward Parrish</i> , Philadelphia.	<i>Ezekiel H. Sargent</i> , Chicago.	<i>John W. Shedden</i> , New York.
Sept. 10, 1867...	New York, N. Y.....	<i>John Mithau</i> , New York.	<i>Robert F. Brown</i> , Leavenworth, Kan.	<i>N. Hynson Jennings</i> , Baltimore.	<i>Daniel Henchman</i> , Boston.
Sept. 8, 1868...	Philadelphia, Pa.....	<i>Edward Parrish</i> , Philadelphia.	<i>Ferris Bringham</i> , Wilmington, Del.	<i>Edward S. Wayne</i> , Cincinnati.	<i>Albert E. Ebert</i> , Chicago.
Sept. 7, 1869...	Chicago, Ill.....	<i>Ezekiel H. Sargent</i> , Chicago.	<i>Ferdinand W. Sennewald</i> , St. Louis.	<i>John H. Pope</i> , New Orleans.	<i>Jos. S. Orne</i> , Cambridgeport, Mass.
Sept. 13, 1870...	Baltimore, Md.....	<i>Richard H. Stabler</i> , Alexandria, Va.	<i>Fleming G. Grieve</i> , Milledgeville, Ga.	<i>James G. Steele</i> , San Francisco.	<i>Eugene L. Massol</i> , St. Louis.
Sept. 12, 1871...	St. Louis, Mo.....	<i>Enno Sander</i> , St. Louis.	<i>C. Lewis Diehl</i> , Louisville, Ky.	<i>George F. H. Markoe</i> , Boston.	<i>Matthew F. Ash</i> , Jackson, Miss.
Sept. 3, 1872...	Cleveland, O.	<i>Albert E. Ebert</i> , Chicago.	<i>Samuel S. Garrigus</i> , East Saginaw, Mich.	<i>Edward P. Nichols</i> , Newark, N. J.	<i>Henry C. Gaylord</i> , Cleveland, O.
Sept. 16, 1873...	Richmond, Va.....	<i>John F. Hancock</i> , Baltimore.	<i>William Saunders</i> , London, Ont.	<i>John T. Buck</i> , Jackson, Miss.	<i>Paul Baltuff</i> , New York.
Sept. 8, 1874...	Louisville, Ky.....	<i>C. Lewis Diehl</i> , Louisville, Ky.	<i>Joseph Roberts</i> , Baltimore.	<i>William T. Wenzell</i> , San Francisco.	<i>Augustus R. Bayley</i> , Cambridgeport, Mass.
Sept. 7, 1875...	Boston, Mass.....	<i>George F. H. Markoe</i> , Boston.	<i>Frederick Hoffmann</i> , New York.	<i>T. Roberts Baker</i> , Richmond, Va.	<i>Christian F. G. Meyer</i> , St. Louis.
Sept. 12, 1876...	Philadelphia, Pa.....	<i>Charles Bullock</i> , Philadelphia.	<i>Samuel A. D. Sheppard</i> , Boston.	<i>Gustavus J. Luhn</i> , Charleston, S. C.	<i>Jacob D. Wells</i> , Cincinnati.
Sept. 4, 1877...	Toronto, Can.....	<i>William Saunders</i> , London, Ont.	<i>Ewen McIntyre</i> , New York.	<i>John Ingalls</i> , Macon, Ga.	<i>Emilen Painter</i> , San Francisco.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878..	Atlanta, Ga.....	<i>Gustavus J. Luhn</i> , Charleston, S. C.	<i>Frederick T. Whiting</i> , Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	<i>William H. Crawford</i> , St. Louis.
Sept. 9, 1879..	Indianapolis, Ind...	<i>George W. Sloan</i> , Indianapolis, Ind.	<i>T. Roberts Baker</i> , Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	<i>Philip C. Candius</i> , Mobile, Ala.
Sept. 14, 1880..	Saratoga, N. Y.	<i>James T. Skinn</i> , Philadelphia.	George H. Schafer, Fort Madison, Ia.	<i>William S. Thompson</i> , Washington, D. C.	<i>William Simpson</i> , Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo.....	<i>P. Wendover Bedford</i> , New York.	<i>Emlen Painter</i> , San Francisco.	George Leis, Lawrence, Kan.	<i>John F. Judge</i> , Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y.	<i>Charles A. Heinisch</i> , Lancaster, Pa.	<i>John Ingalls</i> , Macon, Ga.	<i>Louis Dohme</i> , Baltimore.	<i>William B. Blanding</i> , Providence, R. I.
Sept. 11, 1883..	Washington, D. C....	<i>William S. Thompson</i> , Washington, D. C.	<i>Charles Rice</i> , New York.	<i>Frederick H. Masi</i> , Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis.....	<i>John Ingalls</i> , Macon, Ga.	<i>John A. Dadd</i> , Milwaukee, Wis.	<i>Henry Canning</i> , Boston.	<i>Charles F. Goodman</i> , Omaha, Neb.
Sept. 8, 1885..	Pittsburg, Pa.....	<i>Joseph Roberts</i> , Baltimore.	Albert H. Hollister, Madison, Wis.	<i>Albert B. Prescott</i> , Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	<i>Chas. A. Tuffy</i> , Dover, N. H.	<i>Henry J. Menninger</i> , Brooklyn, N. Y.	<i>M. W. Alexander</i> , St. Louis.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O.....	John U. Lloyd, Cincinnati.	<i>M. W. Alexander</i> , St. Louis.	A. K. Finlay, New Orleans.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich.....	<i>M. W. Alexander</i> , St. Louis.	Jas. Vernor, Detroit, Mich.	<i>Fred. Wilcox</i> , Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	<i>Emlen Painter</i> , New York.	Karl Simmon, St. Paul, Minn.	<i>Wm. M. Seaby</i> , San Francisco.	Joa. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Ft. Comfort, Va.	<i>A. B. Taylor</i> , Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore.	Jas. M. Good, St. Louis.

LIST OF OFFICERS (Continued.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891..	New Orleans, La.....	A. K. Finlay, New Orleans.	<i>Geo. J. Seabury</i> , New York.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892..	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	<i>Sidney P. Watson</i> , Atlanta, Ga.	<i>Wm. H. Averill</i> , Frankfort, Ky.
Aug. 14, 1893..	Chicago, Ill.....	Edgar L. Patch, Boston.	<i>Leo Edick</i> , South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore.
Sept. 3, 1894..	Asheville, N. C.....	<i>William Simpson</i> , Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895..	Denver, Colo.....	James M. Good, St. Louis.	Chas. E. Dohme, Baltimore.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kan.
Aug. 12, 1896..	Montreal, Can.....	Joseph E. Morrison, Montreal, Can.	Geo. F. Payne, Atlanta, Ga.	Wm. A. Frost, St. Paul, Minn.	Geo. W. Parison, Perth Amboy, N. J.
Aug. 23, 1897..	Lake Minnetonka, } Minn.....	<i>Henry M. Whitney</i> , Lawrence, Mass.	George C. Bartells, Camp Point, Ill.	<i>Wm. S. Thompson</i> , Washington, D. C.	<i>Jacob A. Miller</i> , Harrisburg, Pa.
Aug. 29, 1898..	Baltimore, Md.....	Charles E. Dohme, Baltimore.	George F. Payne, Atlanta, Ga.	James H. Beal, Scio, O.	Miss Josie A. Wanous, Minneapolis, Minn.
Sept. 4, 1899..	Put-in-Bay, O.....	<i>Albert B. Prescott</i> , Ann Arbor, Mich.	Lewis C. Hopp, Cleveland, O.	Wm. L. Dewoody, Pine Bluff, Ark.	Henry R. Gray, Montreal, Can.
May 7, 1900..	Richmond, Va.....	Jno. F. Patton, York, Pa.	James H. Beal, Scio, O.	Jno. W. Gayle, Frankfort, Ky.	E. A. Ruddiman, Nashville, Tenn.
Sept. 16, 1901..	St. Louis, Mo.....	Henry M. Whelpley, St. Louis.	<i>Wm. M. Seaby</i> , San Francisco.	George F. Payne, Atlanta, Ga.	<i>Wm. S. Thompson</i> , Washington, D. C.
Sept. 8, 1902..	Philadelphia, Pa.....	Geo. F. Payne, Atlanta, Ga.	Wm. L. Cliffe, Philadelphia, Pa.	Eugene G. Eberle, Dallas, Tex.	Henry Willis, Quebec, Can.
Aug. 3, 1903..	Mackinac Island, } Mich.....	Lewis C. Hopp, Cleveland, O.	Wm. C. Alpers, New York.	Albert M. Roebig, Stapleton, N. Y.	Otto F. Claus, St. Louis, Mo.

LIST OF OFFICERS (Concluded.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1904...	Kansas City, Mo....	James H. Beal, Scio, O.	<i>Philip C. Candidus</i> , Mobile, Ala.	Wm. Mittelbach, Boonville, Mo.	Julius A. Koch, Pittsburg, Pa.
Sept. 4, 1905...	Atlantic City, N. J. .	Jos. L. Lemberger, Lebanon, Pa.	Chas. Holzhauser, Newark, N. J.	Chas. A. Rapelye, Hartford, Conn.	Fabius C. Godbold, New Orleans, La.
Sept. 3, 1906...	Indianapolis, Ind....	<i>Leo Etzel</i> , South Bend, Ind.	Wm. Mittelbach, Boonville, Mo.	<i>C. S. N. Hallberg</i> , Chicago, Ill.	Thomas P. Cook, New York, N. Y.
Sept. 2, 1907...	New York, N. Y.	<i>Wm. M. Seaby</i> , San Francisco, Cal.	Oscar Oldberg, Chicago, Ill.	Henry H. Rusby, New York, N. Y.	Oscar W. Bethea, Meridian, Miss.
Sept. 7, 1908...	Hot Springs, Ark. . .	Oscar Oldberg, Chicago, Ill.	Eugene G. Eberle, Dallas, Tex.	Wm. Mittelbach, Boonville, Mo.	James H. Beal, Scio, O.
Aug. 16, 1909...	Los Angeles, Cal. . .	Henry H. Rusby, Newark, N. J.,	Clement B. Lowe, Philadelphia, Pa.	Chas. W. Johnson, Seattle, Wash.	Wm. B. Day, Chicago, Ill.
May 2, 1910...	Richmond, Va.	Eugene G. Eberle, Dallas, Tex.	Wm. B. Day, Chicago, Ill.	Otto F. Claus, St. Louis, Mo.	Leonard A. Seltzer, Detroit, Mich.

HONORARY PRESIDENTS.

Philip C. Candidus, Mobile, Ala., 1907-08. Samuel A. D. Sheppard, Boston, Mass., 1908-09. Enno Sander, St. Louis, Mo., 1909-1910.
Ewen McIntyre, New York, N. Y., 1910-1911.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852-54. *Charles A. Tufts*, Dover, N. H., 1865-86.
Samuel M. Colcord, Boston, 1854-56, and Samuel A. D. Sheppard, Boston, 1886-1908.
1857-59. *J. Brown Baxley*, Baltimore, Md., 1863-65. Henry M. Whelpley, St. Louis, 1908-1911.
James S. Aspinwall, New York, 1856-57.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852-53. *Peter W. Bedford*, New York, 1862-63.
Edward Parrish, Philadelphia, 1853-54. *William D. ...*
Edward S. Wayne, Cincinnati, 1864-66.

CORRESPONDING SECRETARIES.

- William Procter, Jr.*, 1852-53, and 1854-57.
Edward Parrish, Philadelphia, 1857-58.
Ambrase Smith, Philadelphia, 1858-59.
William Hegeman, New York, 1859-60.

Peter W. Bedford, New York, 1860-62, and 1863-65.
John M. Maitech, Philadelphia, 1862-63.

PERMANENT SECRETARIES.

- John M. Maitech*, Philadelphia, 1865-Sept., 1893.
Henry M. Whelpley, St. Louis (acting), August, 1893.
Joseph P. Remington, Philadelphia, 1893-94.
Chas. Caspari Jr., Baltimore, 1894-96.

GENERAL SECRETARY.

- Chas. Caspari Jr.*, Baltimore, 1896-1911.

LOCAL SECRETARIES.

For the meeting held in	For the meeting held in
1867..... <i>P. Wendover Bedford</i> .	1897..... <i>Edw. Shumpik</i> .
1868..... <i>Alfred B. Taylor</i> .	1898..... <i>Henry P. Hynson</i> .
1869..... <i>Henry W. Fuller</i> .	1899..... <i>Lewis C. Hopp</i> .
1870..... <i>J. Faris Moore</i> .	1900..... <i>T. Ashby Miller</i> .
1871..... <i>William H. Crawford</i> .	1901..... <i>H. M. Whelpley</i> .
1872..... <i>Henry C. Gaylord</i> .	1902..... <i>Wm. L. Cliffe</i> .
1873..... <i>Thomas H. Hazard</i> .	1903..... <i>F. W. R. Perry</i> .
1874..... <i>Emil Scheffer</i> .	1904..... <i>Joseph C. Wirthman</i> .
1875..... <i>Samuel A. D. Sheppard</i> .	1905..... <i>Wm. C. Wescott</i> .
1876..... <i>Adolphus W. Miller</i> .	1906..... <i>Frank H. Carter</i> .
1877..... <i>Henry J. Rose</i> .	1907..... <i>Thos. P. Cook</i> .
1878..... <i>Jesse W. Rankin</i> .	1908..... <i>Martin A. Eisele</i> .
1879..... <i>Elit Lilly</i> .	1909..... <i>Thos. W. Jones</i> .
1880..... <i>Charles F. Fish</i> .	1910..... <i>T. Ashby Miller</i> .
1881..... <i>William T. Ford</i> .	1911..... <i>C. Herbert Packard</i> .

REPORTERS ON PROGRESS OF PHARMACY.

- C. L. Diehl*, Louisville, Ky., 1873-91, and 1895-1911.
Chas. Rice, New York, N. Y., 1891-92.
Henry Kraemer, Philadelphia, Pa., 1892-95.

OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.

	<i>Chairman.</i>	<i>Vice-Chairman.</i>	<i>Secretary.</i>
1880-81.....	Jos. P. Remington.	<i>Joseph Roberts.</i>	<i>Geo. W. Kennedy.</i>
1881-82.....	"	<i>Wm. J. M. Gordon.</i>	"
1882-83.....	"	"	"
1883-84.....	"	C. Lewis Diehl.	"
1884-85.....	"	<i>John A. Dadd.</i>	"
1885-86.....	"	C. Lewis Diehl.	"
1886-87.....	<i>Wm. S. Thompson.</i>	<i>W. J. Menninger.</i>	"
1887-88.....	Wm. H. Rogers.	Karl Simmon.	"
1888-89.....	Jas. M. Good.	<i>Emilen Psalter.</i>	"
1889-90.....	"	<i>Wm. S. Thompson.</i>	"
1890-91.....	"	"	"
1891-92.....	"	"	"
1892-93.....	"	<i>H. M. Whitney.</i>	"
1893-94.....	"	"	"
1894-95.....	<i>Wm. S. Thompson.</i>	"	"
1895-96.....	"	Wm. C. Alpers.	"
1896-97.....	"	Jas. M. Good.	"
1897-98.....	"	"	"
1898-99.....	"	"	"
1899-00.....	"	"	"
1900-01.....	"	"	"
1901-02.....	<i>A. B. Prescott.</i>	Chas. E. Dohme.	"
1902-03.....	James H. Beal.	Lewis C. Hopp.	Henry M. Whelpley.
1903-04.....	"	<i>Leo Diehl.</i>	"
1904-05.....	"	Jos. L. Lemberger.	"
1905-06.....	"	Wm. C. Alpers.	"
1906-07.....	"	Albert M. Roehrig.	"
1907-08.....	"	"	"
1908-09.....	Jos. P. Remington.	"	"
1909-10.....	"	<i>Wm. S. Thompson.</i>	"

PAST AND PRESENT OFFICERS OF THE SECTIONS.

SECTION ON COMMERCIAL INTERESTS.

<i>Chairman.</i>	<i>Secretary.</i>
1887-88.....A. H. Hollister.	<i>J. W. Colcord.</i>
1888-89....." "	" "
1889-90..... <i>Leo Ethel.</i>	F. B. Kilmer.
1890-91..... <i>Henry Canning.</i>	W. L. Dewoody.
1891-92.....W. H. Torbert.	Arthur Bassett.
1892-93....." "	" "
1893-94.....Wiley Rogers.	Jas. O. Burge.
1894-95..... <i>Geo. J. Seabury.</i>	" "
1895-96....." "	Clay W. Holmes.
1896-97.....Lewis C. Hopp.	E. D'Avignon.
1897-98.....Joseph Jacobs.	Jas. H. Bobbitt.
1898-99....." "	" "
1899-00.....Jas. M. Good.	Chas. A. Rapelye.
1900-01.....Chas. A. Rapelye.	F. W. Meissner.
1901-02.....F. W. Meissner.	E. G. Eberle.
1902-03.....Thos. V. Wooten.	Wm. C. Anderson.
1903-04.....Wm. L. Dewoody.	Robert C. Reilly.
1904-05.....Chas. R. Sherman.	" "
1905-06.....Henry P. Hynson.	Herman D. Kniseley.
1906-07.....Herman D. Kniseley.	Chas. H. Avery.
1907-08.....Jacob Diner.	George O. Young.
1908-09.....Harry B. Mason.	Erich H. Ladish.
1909-10.....Waldo M. Bowman.	G. H. P. Lichthardt.
1910-11.....Franklin M. Apple.	Benj. E. Pritchard.

SECTION ON PHARMACEUTICAL EDUCATION.

<i>Chairman.</i>	<i>Secretary.</i>
1887-88..... <i>John F. Judge.</i>	H. M. Whelpley.
1888-89..... <i>P. W. Bedford.</i>	L. E. Sayre.

SECTION ON SCIENTIFIC PAPERS.

<i>Chairman.</i>	<i>Secretary.</i>
1887-88..... <i>T. Roberts Baker.</i>	A. B. Lyons.
1888-89..... <i>Emlen Painter.</i>	H. M. Whelpley.
1889-90.....H. M. Whelpley.	C. F. Dare.
1890-91.....E. L. Patch.	<i>C. S. N. Hallberg.</i>
1891-92..... <i>C. S. N. Hallberg.</i>	H. W. Snow.
1892-93.....C. T. P. Fennel.	F. G. Ryan.
1893-94.....L. E. Sayre.	C. M. Ford.
1894-95.....A. R. L. Dohme.	Geo. B. Kauffman.
1895-96.....S. P. Sadlier.	W. C. Alpers.
1896-97.....W. C. Alpers.	V. Coblenz.
1897-98.....Edward Kremers.	A. B. Lyons.
1898-99.....Henry H. Rusby.	H. V. Arny.
1899-00.....Frank G. Ryan.	Caswell A. Mayo.
1900-01.....Oscar Oldberg.	Lyman F. Kebler.
1901-02.....Lyman F. Kebler.	Jos. W. England.
1902-03.....J. O. Schlotterbeck.	" "
1903-04.....Wm. A. Puckner.	Eustace H. Gane.
1904-05.....Eustace H. Gane.	Chas. E. Caspari.
1905-06.....Chas. E. Caspari.	Daniel Base.
1906-07.....Reid Hunt.	Virgil Coblenz.
1907-08.....Virgil Coblenz.	Chas. E. Vanderkleed.
1908-09.....Chas. E. Vanderkleed.	Martin I. Wilbert.
1909-10.....Martin I. Wilbert.	Albert H. Clark.
1910-11.....Albert H. Clark.	Wm. O. Richtmann.

SECTION ON PHARMACEUTICAL LEGISLATION.

<i>Chairman.</i>	<i>Secretary.</i>
1887-88.....R. F. Bryant.	W. P. De Forest.
1888-89.....C. W. Day.	J. N. Hurty.

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

<i>Chairman.</i>	<i>Secretary.</i>
1889-90.....P. W. Bedford.	A. B. Stevens.
1890-91.....Wm. Simon.	L. C. Hogan.
1891-92.....A. B. Stevens.	" "
1892-93.....R. G. Eccles.	" "
1893-94....." "	" "
1894-95.....Jas. M. Good.	C. S. N. Hallberg.
1895-96.....C. S. N. Hallberg.	Jas. H. Beal.
1896-97....." "	" "
1897-98.....Jas. H. Beal.	H. Gordon Webster.
1898-99.....A. B. Lyons.	C. B. Lowe.
1899-00.....C. B. Lowe.	J. A. Koch.
1900-01....." "	" "
1901-02.....E. G. Eberle.	J. W. T. Knox.
1902-03.....J. W. T. Knox.	Harry B. Mason.
1903-04.....Harry B. Mason.	Wm. L. Cliffe.
1904-05....." "	" "
1905-06.....Oscar Oldberg.	Jos. W. England.
1906-07....." "	" "
1907-08.....Jos. W. England.	Chas. H. LaWall.
1908-09....." "	" "
1909-10.....Chas. H. LaWall.	Chas. W. Johnson.
1910-11.....Chas. W. Johnson.	W. J. Teeters.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

<i>Chairman.</i>	<i>Secretary.</i>
1900-01.....Henry P. Hynson	F. W. E. Stedem.
1901-02.....F. W. E. Stedem.	Wm. Kaemmerer.
1902-03.....Geo. M. Beringer.	Wm. H. Burke.
1903-04.....Wm. H. Burke.	E. A. Ruddiman.
1904-05.....Chas. A. Kapelye.	Wm. C. Kirchgessner.
1905-06.....Wm. C. Alpers.	H. A. Brown Dunning.
1906-07.....H. A. Brown Dunning.	Joseph Weinstein.
1907-08.....Franklin M. Apple.	" "
1908-09.....Leonard A. Seltzer	E. Fullerton Cook.
1909-10.....Otto Raubenheimer.	Erich H. Ladish.
1910-11.....Louis Saalbach.	P. Henry Utech.

SECTION ON HISTORICAL PHARMACY.

<i>Chairman.</i>	<i>Secretary.</i>
1904-05.....Albert E. Ebert.	Caswell A. Mayo.
1905-06.....John F. Hancock.	C. S. N. Hallberg.
1906-07.....Ewen McIntyre.	Eugene G. Eberle.
1907-08.....Edward V. Howell.	" "
1908-09.....John B. Bond.	" "
1909-10.....Eugene G. Eberle.	John A. Dunn.
1910-11.....Jos. L. Lemberger.	Otto Raubenheimer

THE FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are five permanent Funds at the present time (July 1, 1910), three of which are invested in Massachusetts State bonds, in the name of the Treasurer of the American Pharmaceutical Association.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), containing the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (See Proceedings 1870, pp. 87-96), and this, with a few slight amendments adopted in 1896 and 1900, is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the interest of which for any current year only may be used by the Association for its expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

This article was amended in 1888 and 1896 and again in 1906 and changed to Article IV., Chapter VIII. As now in force, it reads as follows:

"Any member of the Association who shall pay to the Treasurer the sum of \$100.00 during the first year of his connection therewith, and also any member not in arrears, who after ten years shall pay the sum of \$75.00, or after fifteen years the sum of \$50.00, or after twenty years the sum of \$25.00, and any member who may have paid annual dues for thirty-seven consecutive years, shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modi-

fied (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52), again in 1896 (Proceedings, page 17), and again in 1906 (Proceedings, page 100), so as to apply to those who have been members for over twenty years (see Chapter VIII, Article IV, of the By-Laws). Under this clause the life membership (new style) of the present roll is ninety-eight, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be \$75, for 1881 (p. 513) \$613, for 1882 (p. 608) \$685, for 1883 (p. 436) \$904.38, and for 1884 (p. 524) \$944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that \$316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147) it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of \$3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471) the Association ordered again a transfer to the same fund of \$4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the registered securities in which the Life Membership Fund is invested. By vote of the Association, the name of this fund was changed to the William Procter Jr. Fund on September 15, 1902 (see Proceedings 1902, p. 214), but was changed back to its original name, Life Membership Fund, on September 5, 1906 (see Proceedings 1906, p. 100). The report of the Treasurer on the special funds of the Association, contained in the addendum to his annual report (see page 479 of this volume), shows that on July 1, 1910, the value of the Life Membership Fund was \$17,319.85 (face value of securities only given), of which sum the interest for any current year only may be used by the Association for its expenses.

THE EBERT PRIZE FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated for conferring a suitable prize for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products; the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize*.

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882 to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; for 1891, to John U. Lloyd; for 1897, to Albert B. Prescott and Jas. W. T. Knox; for 1898, to Virgil Coblentz; for 1899, to Henry Kraemer; for 1900, to Edward Kremers and Oswald

Schreiner; for 1902, to J. O. Schlotterbeck and H. C. Watkins; for 1903, to Fred. B. Power; for 1905, to Dr. Ernst Schmidt, of Germany; for 1906, to J. O. Schlotterbeck and H. C. Watkins; for 1907, to Fred. B. Power and Frank Tutin; for 1908, to A. B. Stevens and L. E. Warren; for 1909, to Henry Kraemer; and for 1910, to Harry M. Gordin.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to \$683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1910 (Proceedings, p. 477), its reported value was \$927.12 (face value of securities only given). *The annual interest must be applied to a prize for an original investigation meeting the requirements stated above.*

In accordance with the recommendation of the committee on invested, savings and trust funds, submitted and adopted at the fifty-eighth annual meeting, see Proceedings, 1910, p. 454, the name of the Ebert Fund was changed to Ebert Prize Fund, and the amount of the prize limited to \$25.00 until the excess of interest above the sum annually awarded and added to the principal shall amount to \$1,000.00, after which the entire annual interest upon the same shall constitute the Ebert Prize.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to \$525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526-528), and adopted the name *Centennial Fund*.

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when \$582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this fund to the extent contemplated at its foundation; for the amounts paid out have been only \$7.50 to Robt. B. Warder for material used for investigations reported in 1885; \$96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and \$32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892; \$50 to the same investigator in 1893, and \$50 again to the same investigator in 1894. In 1896 the sum of \$22.33 was paid to the Committee on Indicators for material used in their investigations.

The original sum of \$1107.81 (\$525 + \$582.81) had increased in 1883 to \$1232.76. Since 1887 the securities in which the fund is invested are specified in the reports of the Chairman of the Council; the reported value was \$2413.67 (face value of securities only given) on July 1, 1910 (see Proceedings, p. 477). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE ENDOWMENT FUND.

At the fifty-fourth annual meeting, held at Indianapolis, Ind., September, 1906, Messrs. Samuel A. D. Sheppard and James H. Beal proposed the establishment of a permanent

fund to be known as the "Endowment Fund" (see Proc. 1906, p. 99), under the following conditions:

"That the said S. A. D. Sheppard and J. H. Beal jointly agree to pay into said fund one dollar for each twenty dollars contributed and paid into said fund by all other members of this Association up to and until such Endowment Fund shall, with its accumulations of interest, reach the sum of twenty-five thousand dollars (\$25,000).

"That as moneys shall be received as additions to said fund the same shall be invested in such securities as the Council may direct until the interest and other accumulations, together with the amount of the principal, shall reach the sum of twenty five thousand dollars (\$25,000).

"That when the Endowment Fund shall have reached the sum of twenty-five thousand dollars (\$25,000) one-half the income derived therefrom may be used for any purpose deemed wise by the Association.

"That when said Endowment Fund, inclusive of donations, interest and other accumulations, shall amount to the sum of fifty thousand dollars (\$50,000), the Association may use ninety per cent. of the income therefrom for any purpose deemed wise by the Association.

"That under no circumstances whatever shall all the income from said fund be used, but at least ten per cent. thereof shall be annually added to the principal of the Endowment Fund.

"That under no circumstances whatever shall the principal or any part thereof be used for any purpose except investment for income, nor pledged for any debt of obligation of the Association, or any person, nor used for any other purpose or in any other manner than as specified."

Contributions to the Endowment Fund have been made at different times, and the names of the contributors published in the annual volume of Proceedings (see Proc. 1907, pp. 47 and 48; Proc. 1908, pp. 476 and 477; Proc. 1909, p. 464; Proc. 1910, p. 478); according to the Treasurer's report, the total amount contributed up to July 1, 1910, was \$5,049.70.

THE GENERAL FUND.

On February 26, 1909, the Council directed that \$5,000.00 of the current funds of the Association be invested by the Treasurer in some interest-bearing security, to be approved by the Finance Committee and the Chairman of the Council (see Proc. 1909, p. 449). In accordance with this order the Treasurer reported on May 26, 1909, having purchased five \$1,000.00 St. Louis, Mo., 4 per cent. bonds at 103 $\frac{3}{8}$ and accrued interest. Again on November 15, 1909, the treasurer, in accordance with an order of the Council (see motion No. 11, page 449), invested \$5,000.00 of the current funds of the Association in St. Louis city public buildings and public works 4 per cent. gold bonds. All of these bonds are registered in the name of the treasurer of the A. Ph. A. and are kept in the Association's safe deposit box.

THE WM. PROCTER, JR., MONUMENT FUND.

At the fifty-second annual meeting held at Kansas City, Mo., September, 1904, it was resolved to solicit subscriptions for a memorial monument to be erected in the Smithsonian Grounds at Washington, D. C., to the memory of William Procter, Jr., if possible in 1817, the centennial anniversary of his birth. A committee was appointed to take the matter in charge, which since that time has been active in soliciting subscriptions. The names of contributors have been published from time to time in the annual volume of Proceedings (see Proc. 1906, p. 63; Proc. 1907, p. 98).

In September, 1907, at the annual meeting held in New York City, the Association

directed that all moneys collected for the Wm. Procter, Jr., Monument Fund, be turned over to the Treasurer of the A. Ph. A., to be deposited on interest for the benefit of said fund (see Proc. 1907, p. 99). The Treasurer of the A. Ph. A., in his annual report for 1908-1909, reports having received on January 27, 1909, the sum of \$3,413.33 from the Treasurer of the Committee, Benj. T. Fairchild, which was placed on time deposit in the International Bank of St. Louis, Mo., for a period of twelve months at 4 per cent. per annum (see Proc. 1909, p. 472). Since July 1, 1909, \$278.25 have been collected and added to the fund. The total sum to the credit of this fund, including interest on time deposits, according to the treasurer's report (see Proc., 1910, p. 479) on July 1, 1910, amounted to \$3,894.92.

THE COLLEGE PRIZE FUND.

The Association holds this fund in trust for the National College of Pharmacy, Department of Pharmacy of George Washington University, at the request of Murray Galt Motter (see Proc. 1907, p. 54). The Treasurer, in his annual report for 1909-1910, states that no draft has been made against this account since it was opened August 4, 1905. The amount of the fund, including interest, is \$29.82.

THE EBERT LEGACY FUND.

The late Albert E. Ebert having by his will designated the A. Ph. A. as residuary legatee of his estate, it was ordered at the fifty-eighth annual meeting, on recommendation of the committee on invested, savings and trust funds, that the money received from the estate be converted into a fund to be known as the Ebert Legacy Fund, and that this fund be invested in municipal or other public bonds approved by the committee on invested, savings and trust funds and the finance committee, and that this fund be kept intact and the income added thereto until the fund and its accumulations shall together amount to a total of \$10,000.00.

When this sum has been reached, the income derived from the fund shall be devoted to such purposes as will, in the opinion of the Council, best commemorate the founder of the fund and his services to pharmacy.

The reason for the suggestion that the old Ebert Fund and the Ebert Legacy Fund be kept separate was, that the first was given by Mr. Ebert for a specific purpose, while the latter was given to the Association practically without restriction and with the evident intention that the Association should use it in the manner which it deemed best.

On December 14, 1909, the executors of the Ebert estate paid over to the treasurer of the A. Ph. A. the sum of \$2800.00, which has been deposited in bank at interest. The treasurer's report, see page 477, states that on July 1, 1910, this fund amounted to \$2844.00.

ABSTRACT OF PROCEEDINGS OF THE ELEVENTH ANNUAL MEETING OF
THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES,
HELD AT RICHMOND, VIRGINIA, MAY 2-7, 1910.

Twenty-six colleges of pharmacy were represented by delegates at this the eleventh annual meeting. On account of the death of the President of the Conference, Wm. M. Searby, the Vice-President, E. H. La Pierre, presided at the meetings.

The Vice-President in his address called particular attention to the growth of the Conference from seventeen schools at its organization in 1900 at Richmond, Va., to thirty-three schools now holding membership.

The report of the Chairman of the Executive Committee showed that the Conference was doing much toward assisting in raising the standards of pharmaceutical education.

The pharmaceutical syllabus was carefully considered and the conference voted to approve its general scope and purposes. The following were elected to represent the Conference on the general Syllabus Committee: J. H. Beal, H. H. Rusby, J. O. Schlotterbeck, J. A. Koch, W. C. Anderson, C. B. Lowe and H. V. Army.

The By-Laws of the Conference were amended so as to provide that one year of high school shall be the minimum requirement for entrance to all schools holding membership in the Conference.

Prof. J. T. McGill, of Vanderbilt University, read a paper on "The High School in the Southern States." The aim of Prof. McGill's paper was to show that the Southern states had ample high school facilities to prepare students to meet the minimum requirement of one year's high school work.

The following persons were elected as officers of the Conference for the year 1910-1911: President, J. O. Schlotterbeck, University of Michigan, Ann Arbor; Vice-President, W. J. Teeters, State University of Iowa, Iowa City; Secretary-Treasurer, Charles W. Johnson, University of Washington, Seattle; Executive Committee, Chairman, J. A. Koch, Pittsburg College of Pharmacy, Pittsburg; H. C. Stroup, Philadelphia College of Pharmacy, Philadelphia; E. G. Eberle, Baylor University, College of Pharmacy, Dallas, Texas; E. H. La Pierre, Massachusetts College of Pharmacy, Boston; J. M. Good, St. Louis College of Pharmacy, St. Louis.

REPORT

ON THE

PROGRESS OF PHARMACY.

FROM JULY 8, 1909, TO JUNE 30, 1910.

BY C. LEWIS DIEHL.

THE ninth decennial Convention for the Revision of the Pharmacopœia of the United States of America has been held at the appointed time, beginning its sessions almost to the hour, and, having deliberated and passed upon certain rules governing the function of the Board of Trustees, declared the principles that shall control the revision, elected its officers, and appointed a Committee of Revision (increased from 25 to 50 members) to prepare and submit the manuscript for a revised edition of the Pharmacopœia, it has now passed into history.

This is not the place to enter into details regarding the character of the work accomplished by this convention, which was fairly representative of the kindred professions of medicine and pharmacy, nor of the instructions given ; but as an evidence of progress, with which this report is immediately concerned, attention may properly be directed to the fact that, as at previous Conventions, the profession of pharmacy was well in the advance with suggestions, which have made it possible to declare the principles that are to govern the coming Revision, in a satisfactory and expeditious manner. This is not mentioned in a captious spirit, but simply to emphasize the progressive tendency that prevails among pharmacists in the furtherance of their profession, in spite of the modern tendency to commercialize the practice of pharmacy.

The report herewith presented will give abundant evidence of this commendable spirit within the ranks of the pharmaceutical profession, and

this evidence is augmented by the numerous papers, and the discussions thereon, that were presented at the 58th Annual Meeting of this Association, held during the week immediately preceding the Pharmacopœial Convention; while the Synopsis of the work in the local branches of the Association, following these introductory remarks, must convincingly prove that the interest awakened for the betterment and revision of our two legal standards of authority—the U. S. Pharmacopœia and the National Formulary—however dormant it may have been in the past, has become a living issue.

PROCEEDINGS OF THE LOCAL BRANCHES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

(SEASON 1909-1910).

BALTIMORE BRANCH.

October, 1909.—The opening meeting of the Branch for the Winter of 1909-1910 was held on the 21st of the month at the Hotel Caswell, Vice-President Lowry presiding. Chas. Caspari, Jr. opened with a general review of the Los Angeles meeting of the Association and the important work accomplished at that meeting. In consequence of a recommendation embodied in a report of the Committee on Education and Legislation, it was resolved: "That the Baltimore Branch of the American Pharmaceutical Association pledges its support to the proposed Pure Food and Drug Bill now in the hands of the Maryland Pharmaceutical Association," a copy of which was presented. Resolutions of regret at the death of Alpheus P. Sharp (one of the oldest and most respected members of the A. Ph. A.) were also adopted, and the Secretary was instructed to notify Mr. Sharp's family of this action. Attention was called to some amendments of the Maryland Pharmacy Law, which the Board of Pharmacy proposed to ask the General Assembly to enact at the coming session, which were discussed, but no definite action was taken. John B. Thomas was unanimously elected a member of the Council of the A. Ph. A. to represent the Branch for the next three years. Attention was also called to a vacancy on the General Membership Committee of the A. Ph. A. for Maryland, but no action was taken.

December, 1909.—The programs of the November and December meetings were combined at the meeting held on the 16th of this month at the Hotel Caswell, J. F. Hancock presiding in the absence of the President and Vice-President. The *National Formulary Revision* was the subject of discussion in the following order: (1) Basic elixirs and compound spirits; (2) formulas for alcoholic solutions of volatile oils; (3) color standards; (4) character and exact definition of non-official ingredients; (5) elimination of notes; (6) additions to the N. F. The discussions

were held as general as possible and the decisions reached, which seemed to represent the opinions of all, are briefly to the effect: (1) That the inclusion of a few (new) basic elixirs would be desirable; (2) that a general formula, but not specific formulas, for the preparation of alcoholic solutions (spirits) of volatile oils, was considered desirable; (3) that uniformity in the color of preparations could be more likely secured by the use of definite quantities of coloring materials made by a definite formula than by the use of color charts or other color standards; and (4) that it was considered advisable to eliminate general notes. An expression of opinion on the other questions was deferred.

January, 1910.—The annual meeting for 1910 was held at the Hotel Caswell on the 20th of the month, President Hynson presiding. After dispensing with the usual reports and the election of officers for the ensuing year (W. J. Lowry, Jr., President; C. L. Meyer, Vice-President; E. F. Kelly, Secretary-Treasurer), the National Formulary questions, consideration of which was deferred at the last meeting, were taken up and discussed by the members generally, the consensus of opinion being: (1) that non-official ingredients should be defined and wherever possible, standardized, in the N. F.; and (2) that no action be taken at present as to additions to the N. F.

March, 1910.—The program which had been arranged for the meeting of the Branch on March 17th was postponed on account of the interest being taken in the bills before the Maryland General Assembly affecting pharmacy. The meeting was held in the Lecture Hall of the Department of Pharmacy of the University of Maryland, President Lowry presiding. The Executive Committee having secured the attendance of several gentlemen who were thoroughly posted as to the important points of these bills, the discussion proved to be very interesting. As a result the Secretary was instructed to ask on behalf of the Branch, the support of each member of the General Assembly to the Pharmacy Bill.

CHICAGO BRANCH.

October, 1909.—The first meeting of the season was held on the 19th of the month at the Northwestern University building, First Vice-President Storer presiding. In a letter received from President Oldberg, accounting for his absence by reason of his precarious health, occurs the following passage, which will doubtless be appreciated by those best acquainted with his character:

“Please assure my fellow-members that the National Formulary has no truer friend than myself. My criticism of the looseness of Congressional legislation is not in any sense or degree a criticism of the N. F., and my criticism of the N. F. had for its sole object a desire to awaken a realization of the truth that the book, in order to retain its legal authority as a standard, must cease to be a private property of any independent corpo-

ration, and at the same time must be indisputably worthy of the same respect which we bestow upon the Pharmacopœia. I confidently hope and believe that the present Committee on the N. F. is successfully working to that end. A calm and unbiased reading of what I said in my presidential address, read at Los Angeles, ought to convince anyone that any other construction put upon my remarks about the N. F. is a mistaken one."

After the brief reports from the various standing committees were disposed of, the agreed topic for discussion, the Revision of the National Formulary, was taken up as per program, the particular subjects for the evening being: "General Principles: Shall Introductory Notices of Instruction be eliminated?" and "Alcoholic Strength of Elixirs." These were thoroughly discussed by the members present, and the following unanimous conclusion reached regarding the first mentioned subject. "We believe that the principle of General Formulas and Introductory Notices as at present included in the N. F. should be maintained in the next revision." On the second subject no definite action was taken; but it seemed to be the consensus of opinion that "the alcoholic strength of elixirs should be lessened wherever possible." It was decided that the program for the next meeting should be: "Additions to the N. F.;" "Flavors of the N. F.;" "Emulsions of the N. F."

November, 1910.—The second meeting of the season was held at the Northwestern University building on the 16th of the month, Vice-President Storer presiding. The discussion of the Revision of the National Formulary was continued as planned last month, the first in order being the subject of "Additions" which elicited an interesting paper from Otto E. Bruder, who proposed four new tinctures—ambrosia, cactus, passiflora, and pulsatilla—and two new elixirs—cardamom comp. and vanillin comp. He objects to the introduction of any codliver oil extracts, or wine made from this but recommends instead that more attention be given to a palatable form in which codliver oil itself might be administered. Incidentally, Mr. Bruder suggested a simplification of the (general) formula for fluidextracts, and this feature provoked considerable discussion. A paper of Theodore I. Scheipe, called up the subject of "Emulsions," which also provoked animated discussion, particularly in reference to his suggestion and strong recommendation of eggs and milk as emulsifying agents. The subject of "Flavors of the N. F." was postponed for discussion at the next meeting of the Branch.

December, 1909.—On account of the holiday season the meeting of the Branch, held on the 21st of the month at the Northwestern University building, was attended by a smaller number of members than usual. Nevertheless, the meeting proved unusually interesting from the unexpected presence of several guests of honor—President Huhn, of the N. A. R. D., Manager Goddard, of the A. D. S., and Professor Anderson, of the Brooklyn College of Pharmacy—the latter making a very interesting address

bearing on the work of the Association, on the effect of the prerequisite law in New York State, on the coming revision of the U. S. Pharmacopœia, etc., which was followed by some interesting remarks by President Huhn bearing on the higher professional standing of "Pharmacy," which, in his opinion, can be brought about only if pharmacy is made sufficiently lucrative to attract intelligent, well-educated and capable youths. The meeting closed with the nomination of the officers to be elected at the January meeting.

January, 1910.—At the request of Vice-President Storer, seconded by the members present, Mr. Leo Eliel, of Indiana, consented to preside at this meeting, which was held on the 25th of the month at the Northwestern University building, as usual. The nominees for officers of the Branch, to serve during the ensuing year, were confirmed by the unanimous vote cast at the election held as the first business in order—these officers being: C. A. Storer, President; E. N. Gathercoal, First Vice-President; L. A. Becker, Second Vice-President; Mrs. M. M. Gray, Third Vice-President; W. B. Day, Secretary-Treasurer. After receiving and disposing of reports from the Committee on Medical Relations, and from the Committee on Public Relations, the regular program of the meeting was taken up by a "Discussion on the Revision of the U. S. P.," Dr. H. M. Gordin leading with a paper in which he advocated "the elimination of the common identical tests for chemicals," and recommended descriptive definitions for galenical preparations. This paper was followed by one of Professor A. H. Clark, discussing "the official alkaloidal assay processes" as they now appear in the Pharmacopœia. After an animated discussion by Messrs. Puckner, Eliel, Hallberg, Gordin and others, Professor Clark closed by saying that in his mind there is no doubt that since the Pharmacopœia is adopted by law as the standard, the methods of assay should be complete and given in detail. The interest in this meeting was enhanced by the presence of a number of distinguished visitors from other States, members of the A. Ph. A., who responded to the motion of the Chairman by felicitous expressions regarding the work of the Branch as exemplified on this occasion. On closing the meeting it was announced that the proposed amendments to the Illinois Pharmacy Law and a demonstration of the physiological standardization of digitalis would be included in the program of the February meeting of the Branch.

February, 1910.—The stated meeting was held at the usual meeting place on the 15th of the month. In accordance with the program Chairman Wells of the Committee on Legislation of the Illinois Pharmaceutical Association, presented the draft of the proposed revision of the Illinois Pharmacy Act, which was in the main approved by the members present, who seemed to be of the opinion that the features presented in the draft would be very great improvements over the present law. Of paramount interest on the program, however, was a demonstration by Dr. Bernard

Fantus of the College of Physicians and Surgeons of the University of Illinois "On the Physiological Assay of Digitalis." Dr. Fantus discussed the various methods of physiological assay of this drug and the advantage of using cold-blooded animals, especially frogs. He then demonstrated the technique, using frogs injected with measured amounts of infusion of digitalis, and, while waiting for the development of the physiological effect, discussed the comparative action and strength of the different preparations of digitalis. While the author prefers the use of the infusion in his practice, the tincture has been found more active than the infusion. Incidentally, also, he found that the official infusion keeps remarkably well as compared with a simple aqueous infusion. Dr. Fantus can see no necessity for fluidextract of digitalis leaves, the tincture being sufficiently concentrated. The finest selected digitalis leaves should be used for preparing the infusion; the use of the fluidextract instead of the drug for making the infusion, would be almost a crime. At the close of the meeting it was announced that at the stated meeting in March a symposium on the U. S. P. and N. F. would be held.

March, 1910.—The meeting of the Branch held on the 15th of this month at the usual meeting place, was one of the most interesting of the season, nearly seventy members and medical friends attending. By request, Mr. Leo Eliel, of Indiana, presided and presented the speakers participating in the "Symposium on the U. S. P. and N. F." composing the announced program. Prof. Hallberg summarized the salient features of the subject selected, saying that the principal criticism by pharmacists has been the nomenclature, the purity standards, and the retention of certain compound preparations and mixtures in the U. S. P. whereas some medical men are opposed to such drugs and preparations as in their opinion have no decided therapeutic action. They favor extension of the standardization principle to such drugs whose activity can only be determined by physiological assay. Dr. Lyman F. Kebler followed, discussing the status of the Pharmacopœia as a legal standard and its bearing on importation of drugs and chemicals. He instanced the character of adulterations, and the permissible presence of foreign material, and emphasized the great need of authentic botanical specimens for the identification of drugs, regarding however as satisfactory the results given by the official assay processes. Concerning the suggestion that "The Compound Preparations and Mixtures be dropped or transferred to the N. F.," Dr. Jas. G. Kiernan says that physicians ought to be slow to suggest the omission of such mixtures as had borne the test of time and were still in demand. Many of these compound preparations have been tested and approved clinically. He was of the opinion that the action of medicines on the lower animals, such as frogs could not be accepted as a criterion of the effect on man. Moreover, the synergistic effect of a combination of drugs might differ greatly from that of any one of them. Dr. Wm. L. Baum, the

next speaker, agreed with Dr. Kiernan that we stand on the threshold of a knowledge of the physiological action of drugs. The physiological chemist cannot explain what becomes of a drug when taken into the system or how it produces its effects. After an exhibit by C. M. Snow of the summaries from a tabulation of one hundred thousand prescriptions, a general discussion followed, from which it became evident that the participants at this meeting do not favor the dropping of compound preparations from the Pharmacopœia.

April, 1910.—The last meeting of the season 1909-1910 was held on the 15th of the month at the Northwestern University building, President Storer presiding. After the disposal of a number of reports the regular program of the evening, Discussion of General Principles for Revision of the U. S. P. was taken up, and disposed of in 10 sections, with results as follows :

1. The present plan of nomenclature for synthetic products, using abbreviated chemical names was approved.
2. The proposal to adopt the atomic weights as furnished by the International Committee (O-16), was not opposed.
3. The vote on restoring important synonyms to the text of the U. S. P., is in the affirmative.
4. The attention of the temperature for specific gravities at 25° C., occasioned a general discussion, resulting in the reference of the whole matter to the Government Bureau of Standards.
5. The inclusion of general directions for determining physical constants in the U. S. P. is recommended.
6. In view of the proposition from some quarters that such drugs as are fully represented by their active principle be dropped, it is the opinion of the Branch, prevailing at this meeting, that these drugs and the galenical preparations made from them should *not* be discarded in favor of active principles which are presumed to represent them.
7. The question of recognition of distilled spirit in the U. S. P. was the subject of differences of opinion which left it undecided.
8. It was unanimously recommended that general processes and formulas, reducing the present details of description in each case, be introduced in the U. S. P.
9. The suggestion that the alcoholic strengths of menstrea be given by volume percentage with a general method in tabular form for preparing these various percentages, thus doing away with much detail in the body of the text, is approved.
10. It is recommended that a classification of methods of storing and preservation be adopted.

At this meeting also a resolution introduced by Mr. Bruder, which provides that the N. F. should be revised by means of an annual supplement having the same legal value as the Formulary itself, was discussed and referred to the Committee on National Formulary.

DENVER BRANCH.

January, 1910.—The first meeting of the season was held on the 11th of the month, President Bresler presiding, who, in calling the meeting to order, announced that a discussion of the N. F. revision was the principal topic of the evening's program. He called attention to the adverse criticism of the N. F. by many of the pharmaceutical journals and recommended protest. A. W. Clark, in view of the fact that many of the substances directed in the formulas of the N. F. have no standard of quality, strength or purity, recommended the adoption of such standards for the revised edition. The subject of using fluidextracts in the production of elixirs was criticized unfavorably, it being the sense of the meeting that—the strong alcoholic ones in particular—should not be so used, or when therapeutic value or elegance were sacrificed for simplicity of process. Several new preparations—"Elixir of Saw Palmetto and Santal Compound," "Aromatic Castor Oil," and "Syrup of White Pine Compound with Codeine and Tar"—were proposed, and formulas are given by Mr. Nitardy for the last two in the A. Ph. A. Bulletin (Feb., 1909, 96). The subject of color standards was discussed. It was suggested that caramel solution might be standardized by comparing a definite dilution in a specific manner with a color plate, while Charles M. Foid suggested the possible utility of a harmless coal-tar dye as a substitute for cudbear. A series of three resolutions were adopted bearing (1) on the remuneration for expenses of delegates to the U. S. P. Convention; (2) on the practice of manufacturing houses to attach labels to their fluidextract containers for making other preparations from them; and (3) on the (alleged) enlistment of the pharmaceutical press of this country, with but few exceptions, in the cause of those whose interest it is to lower the standards and emasculate the tests of the U. S. P.

The election of officers being in order, on motion the present officers were elected to serve another year, viz.: S. L. Bresler, President; Chas. M. Ford, Vice-President; F. W. Nitardy, Secretary-Treasurer.

February, 1910.—The stated meeting of the Branch was held on the 15th of the month, President Bresler presiding. After the reading of an interesting paper by L. L. Alkine "on Diphtheritic Antitoxin and Globulin" the "U. S. P. Revision" was taken up as per announced program and a general discussion resulted, bearing on a variety of subjects which may be consulted in the A. Ph. A. Bulletin (March 1910, 166-167). Several preparations of the N. F. Comp. Syrup of Phosphates, Elixir of Potassium Bromide, and Petroleum Emulsion—also came in for brief criticism. On closing the meeting it was announced that the discussion of the U. S. P. would be continued at the next stated meeting.

March, 1910.—The stated meeting was held on the 15th of the month, Vice-President Ford presiding. The secretary submitted a set of by-laws for the Branch, which he was instructed to prepare. These, on motion

of Mr. Best, were provisionally adopted, a final vote to be taken at the next stated meeting. The principal topic of discussion consisted of a series of thirteen questions on the U. S. P., sent out by Dr. Reid Hunt, chairman of the Committee on the U. S. P. of the American Medical Association. These, with the action taken, may be referred to in the A. Ph. A. Bulletin (May 1910, 282-284). Mr. Nitardy suggested that an annual supplement to the U. S. P. might be of value, if restricted to additions, to meet the complaint, voiced by Dr. Moleen, that physicians fail to take as much interest in the U. S. P. as they ought to, because of the delay in its publication.

April, 1910.—The stated meeting was held on the 20th of the month, after the Branch had been entertained at dinner by Mr. W. A. Hover. After a rising vote of thanks to Mr. Hover, President Bresler called on Mr. Charles Clayton for a paper on the "Synonyms in the U. S. P.", who says among other things that the extent to which the use of synonyms should be carried in the text of the U. S. P. is a question upon which there is a wide diversity of opinion. It would be unreasonable to expect that all common names should be given for every drug mentioned, but on the other hand, it would seem to be not only reasonable, but almost imperative, that the names by which various drugs and preparations are best known should be included as synonyms. The compilers of the present Pharmacopœia attempted to dignify the work by substituting for the commonly known English names of many articles, an anglicised form of the Latin name. This, however acceptable to physicians, pharmacists and scientists, failed of success because, so far as the retail druggist is concerned, the bulk of his business is done with the comparatively uneducated public, who ask for what they want by the names to which they are accustomed, which names in many instances are not to be found in the Pharmacopœia. As to the use of copyrighted names of the synthetic chemicals as synonyms for their official counterparts, it would seem to be doubtful wisdom to give their rivals the advertising advantage which would occur if their names were mentioned. On the other hand, the present official names of some of these articles are rather long and cumbersome and it would seem that the adoption of some shorter and more easily memorized synonym might result in their more frequent prescription. In the discussion following it developed that the members generally coincided with the views so ably presented by Mr. Clayton, which were fully endorsed. A series of resolutions circulated by the N. W. D. A., concerning the forthcoming revision of the U. S. P. were presented at this meeting and after discussion and deliberation were adopted by a unanimous vote. A number of other questions of minor importance were discussed but no action taken. The Branch then adjourned, the date of the next meeting to be determined after the return of the delegation from the U. S. P. Convention.

NASHVILLE BRANCH.

May, 1909.—Owing to the large accession of members in Tennessee through the efforts of Mr. Burge and his associates, a Branch has been organized in Nashville with over thirty members.

June, 1910.—A meeting of the Branch was held on the 9th of the month, with the following officers present :—J. O. Burge, President ; Ira B. Clark, Vice-President ; Lucius P. Brown, Secretary. President Burge read a paper on the subject of weights and measures, stating that he had used the metric system exclusively in manufacturing and found it was convenient and much easier than the old system. The president's experience was the principal subject of discussion in which a number of members participated. Measures were inaugurated to furnish topics of interest for discussion at the stated meetings of the Branch. The topics for discussion at the next meeting will be "What Books Should Be in the Druggist's Library," and "Filtration."

NEW ENGLAND BRANCH.

December, 1909.—The annual meeting of this Branch was held at Hotel Plaza, Boston, on the 7th of the month ; the following officers were elected for the ensuing year : James E. Finneran, President ; James O'Hare, Vice-President ; R. Albro Newton, Secretary-Treasurer. The principal topic discussed at this meeting was the next revision of the Pharmacopœia. A number of suggestions were made, but no formal action was taken. The Branch adjourned without deciding upon the date of the next meeting.

January, 1910.—The meeting held on the 11th of this month at Hotel Plaza, Boston, was attended by a committee appointed by the Massachusetts Medical Society to consider the Pharmacopœial revision, and proved very interesting. This committee thought that a smaller book would be most agreeable to the physicians in general, toward which end they had sent out 3000 pamphlets containing a list of official articles asking that the members indicate which they desired to have omitted. The fact that 50 per cent. had done as requested shows remarkable interest in this work. No definite action was taken at this meeting, the discussion being practically confined to matters pertaining to the U. S. P.

February, 1910.—The meeting held on the 18th of the month at the Hotel Plaza, Boston, was again attended by several members of the Massachusetts Medical Society, and the principal topic of discussion, as at the previous meeting, was the revision of the U. S. P.—the discussion, however, tending more toward details regarding the individual preparations. Elie H. LaPierre was re-elected as a member of the Council from this Branch.

April, 1910.—The last regular meeting of the season was held at Hotel Plaza, Boston, on the 13th of the month, and was unusually well attended, Although the subject for discussion was to have been the first twenty-five

articles in the N. F., much time was given to a discussion of the laws in Massachusetts and Rhode Island. The only change recommended in a N. F. preparation was in the process of hydrated oxide of bismuth, which seems most unsatisfactory. The question of doses in the U. S. P. was discussed, but no agreement was reached as to the character of the doses, some favoring average doses, others the maximum. It was voted to invite the Association to meet in Boston in 1911.

NEW ORLEANS BRANCH.

October, 1909.—The sixth monthly meeting (of the year) was held in the rooms of the New Orleans College of Pharmacy, President Godbold presiding. As this was the first meeting since the close of the summer months, there was no scientific program for the evening. Mr. Philip Asher gave an entertaining account of his trip to the Pacific Coast and of his attendance at the Los Angeles meeting of the Association. Mr. Godbold also spoke of Association matters, calling attention to the great good the A. Ph. A. was doing. A number of topics for discussion at the next stated meeting having been announced, the meeting adjourned to partake of a substantial supper served in honor of President Godbold, the "Nestor" of Louisiana Pharmacy.

NEW YORK BRANCH.

November, 1909.—The first meeting of the season 1909-1910 was held on the 8th of the month. The only Committee report received was that of the Committee on Education and Legislation, and there was no set program, although subjects connected with the revision of the U. S. P. afforded abundant material for the discussions of the evening, which were participated in by Messrs. Diner, Mayo, Coblenz, Raubenheimer, Plaut, and others. In a paper "On the Assay of Opium and Its Preparations," which constituted a constructive criticism of the U. S. P., Dr. G. C. Diekman deplored the lack of definiteness in the official directions for extracting the samples and suggested a number of changes in the process which he regards essential. The paper was referred to the U. S. P. committee of the A. Ph. A. Following this, the Branch was entertained by a very instructive talk on "The Bacteriological Importance of Calomel," by Dr. S. P. Klein. After a vote of thanks to Dr. Klein, the Branch adjourned to meet on December 13th.

December, 1909.—The stated meeting of the Branch (the twenty-third in its existence) was held on the 13th of the month, President Diner presiding, with a large attendance of members and visitors. After a brief verbal report on pharmacal education in Germany, by Dr. G. C. Diekman, Chairman of the Committee on the Progress of Pharmacy, and the reading of an opinion given by State's Attorney General O'Malley on a mooted phase of the anti-cocaine law, a paper on "The Federal Law and the

Pharmacopœia" was read by Dr. H. H. Rusby, which proved to be the most interesting topic for discussion and practically engaged the attention of the Branch during the remainder of the evening. In summing up after the discussion on his paper (which was participated in by Messrs. Seil, Diekman, Roehrig, Lohman, Mansfield, Weinstein, Diner, Raubenheimer, McDowell, Gallagher, Flowers, Bigelow, Lascoff, McElhenie and Darling), Dr. Rusby held to his belief in a Pharmacopœia of more definiteness and wider scope, and to his advocacy of publicity. An evident attempt at secrecy and not a desire for publicity was, he said, recognized in law and ethics as justification for a presumption of ulterior motives. His motion, he said, was to preclude any advantage to any member of the committee in the publication of any commentary on the Pharmacopœia or work on materia medica; and also to have criticism before rather than after the adoption of a standard. On motion, the Secretary was instructed to have the paper by Dr. Rusby, and an abstract of the discussion printed and distributed to the delegates of the 1910 Pharmacopœial Convention.

January, 1910.—The meeting of the Branch, held on the 10th of the month, constituted the third annual meeting in its history and resulted in the election of the following officers: Otto Raubenheimer, President; A. M. Roehrig, Vice-President; Hugh Craig, Secretary; Joseph Weinstein, Treasurer. Reports were received from the committees on education and legislation, and from the committees on the science and practice of pharmacy, the latter presenting abstract translations of recent contributions to the German and French pharmacal literature. The attention of the Branch having been called by the retiring president to an objection which had been made to that portion of the report of the committee on the president's address at the Los Angeles meeting of the A. Ph. A. which had to do with the status of the pharmacists in the public service, the members were invited to discuss the subject, with the result that the Branch, by appropriate resolutions, places itself on record as disapproving the objectionable expressions regarding the pharmacist in the public service, as they appear in the aforesaid report on the president's address. The papers that engaged the attention of the Branch at this meeting were the following: "Linimentum Camphoræ," by G. A. Ferguson; "Note on the Assay of Opium," by E. L. Patch (of Boston); and "The Essential Oils of the U. S. P.," the latter being a translation of a paper by Paul Jeancard and Conrad Latie, of Cannes, France. These several papers were discussed by Messrs. Diner, Raubenheimer, Kleber, Seil and Dodge, and suitable acknowledgements were made to their authors.

February, 1910.—The stated meeting of the Branch, held on the 15th of the month, President Raubenheimer presiding, was devoted to the announced program, "Maceration and Percolation." These operations were authoritatively elucidated by Professors John Uri Lloyd and Remington, followed by President Raubenheimer, and Messrs. Beringer, Dunn,

Flowers, Diekman, Gallagher, Hirsman, Weinstein, Mayo, McElhenie, and Mayer, and should be consulted as reported in the A. Ph. A. Bulletin (March, 1910, 151-153). A report from the Committee on Education and Legislation led to the statement by Mr. Flowers that to require graduates of chartered colleges of pharmacy to pass a board examination in order to secure a license to practice pharmacy was to deprive the colleges of their constitutional rights, hence illegal, which was followed by considerable discussion. On closing it was announced that the National Formulary would be discussed at the next stated meeting.

March, 1910.—The stated meeting of the Branch, held on the 14th of the month, was devoted principally to a discussion of the revision of the National Formulary. Reports were received from the Committee on Membership, the Committee on Professional Relations, and the Committee on Education and Legislation. On motion of Mr. Mayo the last-named committee was instructed to express antagonism to the bill for certain specified reasons which came up during the discussion. President Raubenheimer opened the subject of the revision of the National Formulary, speaking in favor of a divided book: one part to consist of formulas, the other of descriptions and standards for simples used in these formulas and not recognized in the U. S. P. A. M. Roehrig brought up the question of the legal right of the A. Ph. A. to delete any formula from the N. F. since these were part of the law. Mr. Flowers emphasized the necessity of meeting the requirements of the medical profession in official preparations. Mr. Raubenheimer exhibited a number of improved N. F. preparations, and Mr. McElhenie also showed a number of preparations improved according to his own suggestion. These subjects gave rise to an animated discussion in which, in addition to the gentlemen mentioned, Messrs. Craig, McElhenie, Muir, Anderson, DeYonge, Weinstein, Mayer and MacDowell, participated.

April, 1910.—At this meeting of the Branch, held on the 11th of the month, the principal topic offered for discussion was introduced by the reading of a number of resolutions adopted by the Washington Branch to govern the Revision of the Pharmacopœia. The discussion of these resolutions was opened by Dr. Rusby, who expressed himself as being opposed to the deletion from the Pharmacopœial fold of any drug which was called for by physicians and public in the treatment of disease. Dr. R. A. Hatcher, who took a prominent part in the discussion, took a position opposed to the far-reaching Pharmacopœia suggested by Dr. Rusby. Jacob Diner was of the opinion that there should be some legal standard for all drugs where such was possible, and that these standards should preferably be in the Pharmacopœia, and this view was that of practically all the pharmacists present; but, in view of the equal standing of the N. F. before the law, all formulas for complex preparations might well be transferred to the N. F. The various utterances of the Washington

Branch were discussed also by Messrs. Anderson, Craig, Flowers, Gallagher, Goeckel, Lascoff, McElhenie, Roehrig, and Weinstein. The conclusions of the Branch are summed up in a number of utterances which may be consulted in the A. Ph. A. Bulletin (May 1910, 287-288).

A number of reports were received and disposed of at this meeting. Vice-President Roehrig, having been ordered to the Marine Hospital Station at Buffalo, and consequently resigned from the vice-presidency of the Branch, was elected an honorary president of the same. The death of P. C. Candidus, one of the oldest associates in time of membership and one of the honorary presidents of the A. Ph. A. was referred to by President Raubenheimer, who, with Messrs. Cook and Roehrig, spoke of the endearing qualities of the deceased. It was ordered that a page be set aside in the minutes in memory of Mr. Candidus and that a letter of condolence be sent to his widow.

NORTHERN OHIO BRANCH.

November, 1909.—The stated meeting of the Branch was held on the 19th of the month, President Hopp presiding. The topics for discussion at this meeting were embodied in a paper prepared by M. G. Tielke in which a number of preparations of the U. S. P. and N. F. were criticized, embracing the following: Compound tincture of gentian; compound tincture of cinchona; elixir of calisaya; elixir of gentian; glycerinated elixir of gentian; bitter wine of iron; the several preparations of iron, quinine and strychnine; the several preparations of hypophosphites; and elixir of glycerophosphates. Various improvements were suggested, which were discussed by Messrs. Army, Hopp, Fox and other members present. At the close of the meeting it was announced that the laxatives of the U. S. P. and N. F. would be discussed at the next meeting.

December, 1909.—At the stated meeting of this month the business consisted of a discussion of the laxatives of the U. S. P. and N. F. as previously announced. The discussion was led by Mr. Hankey and comparison of samples of the following preparations was made by the members present: Aromatic fluidextract of cascara sagrada; compound solution of sodium phosphate; emulsion of castor oil; confection of senna; effervescent magnesium sulphate; compound powder of rhubarb; compound powder of glycyrrhiza; and compound cathartic elixir.

January, 1910.—The stated meeting was held on the 28th of the month, President Hopp presiding. The topics for discussion were presented in a paper prepared by O. E. Muhlhan on the Expectorants of the U. S. P. and N. F., which were represented by several samples of the preparations discussed and made by the pharmacists present. The following preparations were criticized: Compound tincture of benzoïn, compound syrup of squills, syrup of tar, wine of tar, mixture of ammonium chloride, syrup of senega, and compound mixture of glycyrrhiza. The following officers were

elected for the ensuing year: Lewis C. Hopp, President; William T. Hankey, Vice-President; H. V. Army, Secretary-Treasurer.

April, 1910.—The stated meeting was held on the 15th of the month, President Hopp presiding. The subject of "Color Standards" was presented in a paper prepared by Professor Feil, who in the discussion following was ably seconded by Professor Army. This interesting discussion may be consulted in the A. Ph. A. Bulletin (June, 1907, 371).

NORTHWESTERN BRANCH.

October (?), 1909.—At a meeting held at the Nicollet Hotel, Minneapolis, President Wulling presiding, the chief business was the election of officers, which resulted as follows: W. A. Frost, President; Stewart Gamble, Vice-President; Frederick J. Wulling, Secretary-Treasurer.

January (?), 1910.—At the meeting held at the Nicollet Hotel, Minneapolis, the newly-elected president, W. A. Frost, presiding, the question of consolidating the Pharmacopœia and the National Formulary into one volume was presented for discussion, but was quickly decided in the negative. After an address by the retiring president, F. J. Wulling, and a brief response by the incoming president, W. A. Frost, the regular program of the evening was presented in a paper on "The Ownership of the Pharmacopœia," read by F. J. Wulling. Animated discussion followed, participated in by Messrs. Gamble, Wittich, Melendy and Vœgeli, the sentiment of the meeting being crystallized by the unanimous adoption of a motion opposing the ownership of the Pharmacopœia by the government. The rest of the evening was devoted to the matter of the coming Pharmacopœial revision, and on the question of the desirability of a National Board of Health. The latter was favorably emphasized, but the majority opposed the suggestion that the publication of the Pharmacopœia should be turned over to some such department, maintaining that the present method of revision should be continued.

PHILADELPHIA BRANCH.

October, 1909.—The first of the season's meetings of the Branch was held at the College of Physicians on the 5th of the month, President Blair presiding. This meeting following after the annual meetings of the different affiliated bodies had been held was mainly devoted to the reception and discussion of the reports presented by the different delegations, such as the delegates to the American Medical Association, the Pennsylvania Pharmaceutical Association, the A. Ph. A., the N. A. R. D. and the N. W. D. A. The proceedings of this meeting may be consulted in the A. Ph. A. Bulletin (Nov., 1909, 439-441).

The first meeting for this season of the Scientific Section of the Branch, was held October 14th and was devoted almost entirely to the discussion of digitalis, which was considered in detail from the viewpoint of Pharma-

cognosy, Chemistry, Physiological Standardization, and Therapeutic Uses, by men who have made a special study of the drug in their respective vocations—this forming a highly interesting “Symposium upon Digitalis,” which may be consulted in its entirety in the A. Ph. A. Bulletin (Dec., 1909, 491-493). Professor E. L. Newcomb, who has grown digitalis under many conditions at Vineland, N. J., presented in a clear, concise, and logical manner the “Pharmacognosy of Digitalis.” Professor Charles H. Kimberly presented the intricate “Chemistry of Digitalis” in a masterly way. Dr. T. Stotesbury Githens pointed out the necessity of the “Physiological Standardization of Digitalis;” and Dr. Henry Beates, Jr., in a very able and original way described the action and “Therapeutic Uses of Digitalis,” enumerating briefly his observations during many years of clinical study of the drug. The discussion following the reading of these papers was participated in by Drs. Wm. E. Robertson, Worth Hale, H. C. Wood, Jr., and E. A. Hoffer, Mr. J. K. Thum, and Professors I. V. Stanislaus and J. P. Remington.

November, 1909.—The meeting of the Scientific Section of the Branch was held on the 11th of this month at the Medico-Chirurgical College, and constituted a “Symposium upon Medicinal Chemicals” in which much valuable information was presented. Professor Virgil Coblenz spoke on the subject of “Improvements in Tests of Medicinal Chemicals,” and Dr. George D. Rosengarten spoke of the “Manufacturing of Medicinal Chemicals” and the many requirements of the 1900 Pharmacopœia that could not be practically complied with, referring, however, to the fact that these objections were largely overcome by the corrections later sent out. The details of this symposium may be consulted in the A. Ph. A. Bulletin (Dec. 1909, 493-494).

The regular meeting of the Branch was held on November 2nd, and was mainly devoted to topics connected with the “Prescription.” Dr. E. L. Thornton presented an instructive paper on “Modern Methods of Teaching Prescription Writing in Medical Schools”; Mr. Franklin M. Apple a contribution in which he considered “The Prescription from the Pharmacist’s View-Point”; and Dr. Daniel J. McCarthy gave an extemporaneous talk on “The Prescription—Copy or Label—Indiscriminate Renewals—and a Brief Consideration of the Legal Aspect.” The final topic, “Who Owns the Prescription,” was discussed in an interesting way by Messrs. Cliffe, Wood, LaWall, Cattell, Poley, Blair, Cabell, Thum, and others, all of whom agreed that it belonged to the pharmacist.

December, 1909.—The stated meeting of the Branch was held on the 2nd of the month in Cadwallader Hall, in the magnificent home of the College of Physicians. The program of the evening included discussions of “The Report of the Committee on the U. S. P. of the A. Ph. A.” and “The Pharmacist’s Part in the Coming Revision of the U. S. P.” The topics thus brought up were interestingly discussed by Messrs. Blair, Koch,

Apple, England, Morgan, Beringer, Cook, Remington, Stanislaus, Kraemer, LaWall, Beates, Krauss, Pearson, Brinton, and others not named in the report of the meeting. The consensus of opinion appeared to prevail that the retail pharmacist would be very much in evidence with valuable suggestions at the coming convention and in the revision of the U. S. P.

The Scientific Section of the Branch held its regular monthly meeting at the Laboratory of Pharmacology, University of Pennsylvania, on the 9th of the month, the subject of the evening being "The Mydriatic Drugs." Prof. Henry Kraemer presented a paper on "The Pharmacognosy of the Mydriatic Drugs" which were considered in an admirable and highly instructive manner under eight botanical subdivisions. Mr. Joseph L. Turner in a most interesting way discussed "The Chemistry of the Mydriatic Alkaloids" namely: Atropine, hyoscyamine, pseudo-hyoscyamine, hyoscine, atropamine, belladonnine, and scopolamine. L. H. Bernegau made a number of "Suggestions for Improvements of U. S. P. Methods for Assay of Mydriatic Drugs," and recommended the addition of fluidextract of belladonna leaves and solid extract of belladonna root, with standards, in the U. S. P. "The Pharmacology of the Mydriatic Drugs" was ably presented by Dr. H. C. Wood, Jr., through whose courtesy the beautiful Laboratory of Pharmacology was opened for inspection of the members present at this meeting. The subject of the evening was discussed by Drs. Stanislaus, Morgan, Hoffer, Kimberley and Cohn, Professors Kraemer and Lawall, and Messrs. Apple, Cliffe, Turner, Blair, and Pearson. A detailed report of this meeting appears in the January number of the A. Ph. A. Bulletin (p. 27-28).

January, 1910.—The regular meeting of the Branch was held on the 6th of the month. Resolutions of respect to the memory of Mahlon N. Kline were adopted and directed to be engrossed and sent to the bereaved family. The principal topic for discussion was "The National Formulary," Mr. Apple opening the discussion by directing attention to the dignity acquired by the work since its creation as a standard under the Food and Drugs Act, which makes it incumbent on the A. Ph. A. in the present revision to make it quite as dignified a work as the U. S. P. Mr. Apple was followed by Professor Cook, who gave some information as to what was being done in this direction by the N. F. Committee in the present revision, and he was followed by criticisms and suggestions made by Messrs. Blair, Cliffe, Cattell, LaWall, Brinton, Minehart, Kendig, and Stanislaus, which may be consulted in the A. Ph. A. Bulletin of March (p. 159-161). In the face of much unfavorable criticism developed by the discussion, Professor Stanislaus made a strong plea in defense of the N. F. He said that this book, which was welcomed a few years ago as the "sure cure for the ailments of medicine and pharmacy," was now characterized in some quarters as the "creation of substitutors and frauds, a miserable jumble of slipshod formulas and a collection of therapeutic monstrosities." The

cry for simples and criticism of mixtures he regards as untimely, since the large mass of general practitioners will prescribe mixtures, and if the pharmacist fails to produce them he simply plays directly into the specialty manufacturer's hands. It is here where the N. F. shoe pinches the most.

The Scientific Section of the Branch held its January meeting in the library of the H. K. Mulford Company, the subject of the evening being "Standards for Volatile Oils." Dr. I. V. S. Stanislaus opened the subject by presenting a resume of the very extensive data he had collected from many sources. This was followed by a paper received from Dr. Wm. Ungerer of New York, entitled "Who makes the Adulterator?" to which he answers "the purchaser!" because he is the one who demands a product below the actual cost of production. Dr. Ungerer also presented a paper entitled "The Would-be Perfumer," in which he stated that the success of a perfume depends on three factors: (1) highest quality of materials; (2) perfect formulæ; (3) expert manipulation. Dr. Ungerer named those anticipating entering this line of work to consider the many difficulties that are sure to be encountered. The reading of these papers was followed by an animated discussion, bringing out interesting points, participated in by Messrs. Brinton, Sadtler, Remington, Pancoast, LaWall, Kimberly, Miller, Hilts, Swinton, Graham, Vanderkleed, and Pearson. (See A. Ph. A. Bulletin, Febr., 1910, 107-109).

February, 1910.—The stated meeting of the Branch was held on the 3d of the month, and after the consideration of routine matter, was devoted to the consideration and discussion of a series of suggestions for improvements in the N. F., presented by Mr. Joseph W. England, and of a number of papers on the National Formulary contributed by other members of the Branch. After considerable discussion it was considered advisable to postpone action on Mr. England's suggestions until the next stated meeting, when they were to be taken up *seriatim*. The first paper of the evening was presented by Franklin M. Apple on "Alternation Weights and Measures in the N. F. From the Pharmacist's Viewpoint." This was followed by a paper by C. Mahlon Kline, entitled "The N. F. from the Standpoint of the Manufacturer"; a paper by George M. Beringer on "Some of the Dangers and Responsibilities of the N. F. Revision," and a paper by E. Fullerton Cook on "Sterilization in the N. F." John K. Thum also presented an interesting series of suggestions for improvements in the U. S. P. and N. F. The discussion following the reading of the papers mentioned (which appear in the A. Ph. A. Bulletin of April, 215-221) was participated in by Messrs. LaWall, Thum, Stanislaus, Kraemer, Koch, Stundt, Blair, England, and others.

The Scientific Section of the Branch held its meeting at the Temple University on the 10th of the month, the subject of the evening being "Synthetic Remedial Agents." Dr. C. E. de M. Sajons opened by dis-

cusssing the synthetic from the standpoint of their "Therapeutics." This was followed by a paper by Prof. Chas. H. LaWall on "The Manufacture of Synthetic Compounds;" and a paper by Prof. Charles E. Vanderkleed on "The Chemistry of the Suprarenal Gland." The latter subject was discussed quite extensively by Drs. Minehardt, Horn, Morgan, Addicks, Kendig, and Sajous.

March, 1910.—The stated meeting of the Branch was held on the 3rd of the month, President Blair presiding. After the dispatch of routine business, the election of officers for the ensuing year was held, which resulted as follows: Frank E. Morgan, President; R. W. Cuthbert, First Vice-President; F. E. Stewart, Second Vice-President; Ambrose Hunsberger, Secretary-Treasurer. The "Suggestions On the N. F." offered by Mr. England at the last meeting were then taken up seriatim and discussed. It was generally agreed that standards must be given in the N. F. if laws were to be enforced properly. Another point strongly urged was the need for co-ordinated effort on the part of the two committees which have in charge the revision of the U. S. P. and the N. F. The suggestion that the N. F. include deletions from the U. S. P. brought out the query as to the right of the N. F. to re-establish the legal standard of an article deleted from the Pharmacopœia. Complex formulas, credited with therapeutic virtue and popular among a reasonably large number of medical practitioners, must be retained for working guides. Regarding the class of preparations generally referred to as "imitations," it is held that the physical characteristics of all the preparations in the N. F. should be such as to preclude any suspicion of attempted imitation. Postponing the further consideration of the suggestions to the April meeting, a resolution was adopted as the sense of the Branch: That in the preparation of the text for standards of the substances and their preparations in the new edition of the N. F., the general principles as adopted in the U. S. P. be followed. Those taking an active part in the discussions at this meeting included Messrs. Kraemer, England, Stanislaus, LaWall, Remington, Apple, Stewart, Riegel, Blair, Koch, Staudt, Stroup and Kebler.

The meeting of the Scientific Section of the Branch, which was held on March 10th, was devoted to a discussion of the subject of "Enzymes." The first paper was by Dr. Henry Leffman, in which he comprehensively described "The Nature of Enzymes." This was followed by a paper on "The Physiological Action of Enzymes," by J. W. England. L. H. Bernegau then made a preliminary report upon "The Inhibitory Action of Mechanical Agitation on Rennin," and Dr. Arthur C. Morgan ably discussed "The Therapeutic Uses of Enzymes." These several papers were fully discussed by Messrs. Remington, LaWall, Stanislaus, Leffmann, Ungerer, Turner, and others.

April, 1910.—The stated meeting of the Branch was held on the 7th of the month, President Morgan presiding. The first subject for considera-

tion was a draft of "The Declaration of the Prescription" agreed upon at a joint conference of a committee appointed by the Branch and a similar committee representing the County Medical Society, which was approved tentatively, final action being deferred until the County Medical Society has taken action upon it. The authorship of the form of this declaration (which see in A. Ph. A. Bulletin, June, 1910, 375-376) is credited to Mr. Franklin M. Apple. After a brief discussion of the crusade against the illegal sale of cocaine inaugurated by the State Association, and on matters of minor importance, Dr. F. E. Stewart introduced the set topic for the evening by reading a most comprehensive paper on "Patents and Trademarks in their Relation to Pharmacal Science and Practice," which is briefly reported in abstract in the A. Ph. A. Bulletin (June p. 377-378), and engaged markedly the attention and discussion during the remainder of the evening—Mr. Francis Taylor Chambers of the Philadelphia Bar in opening the discussion, paying a splendid tribute to the thorough manner in which Dr. Stewart had handled the subject. Other speakers were Dr. S. Solis-Cohen and Henry Bates, Jr. Professors Remington and Stanislaus, and the president of the Branch, Mr. Morgan.

May, 1910.—The last meeting of the season was held on the 17th of the month. The scientific program having been a part of a joint meeting held with the County Medical Society in April, there was little beside routine business to be taken up at this meeting of the Branch. After disposing of this, an interesting report of the A. Ph. A. Convention at Richmond was made by Mr. Franklin M. Apple, after which the meeting adjourned.

PITTSBURG BRANCH.

January, 1910.—At the meeting of the Branch, held on the 8th of the month, the principal interest centered on three papers which were read after disposing of routine matters. Dr. Louis Emanuel read a paper entitled "National Formulary Vehiculæ," in which he presented formulæ for a new class of preparations for favorable recognition to the N. F. Committee. This paper appears in full in the A. Ph. A. Bulletin of February, 1910 (p. 125), and should be carefully perused. The second paper, entitled "The Prescription," was contributed by Mr. Peter G. Walter, and is commendable for the homely yet valuable truths and the light it threw upon the importance of commonplace details. The third paper was a valuable and well-prepared contribution concerning the "Hookworm, the Lazy Disease," by Leonard K. Darbaker. The several papers were discussed by Messrs. Beal, Fritchard and Willets.

February, 1910.—On the 8th of this month the Pittsburg Branch held its first annual meeting, the following officers being elected for the ensuing year: John C. Wallace, President; Louis Saalbach, First Vice-President; Richard Mierzwa, Second Vice-President; B. E. Pritchard, Secretary; P. Henry Utech, Treasurer. After the transaction of routine business,

the regular program of the evening was taken up. J. H. Wurdack read a paper on "Window Display," bristling with reproaches for carelessness and neglect, mingled with many ingenious and practical suggestions, both quaint and original. Louis Saalbach submitted a "Report of the Committee on N. F. Recommendations," to which had been referred a number of suggestions and criticisms. After considerable discussion two of the recommendations were adopted, viz.: (1) The Branch is opposed to dropping the preliminary notes prefacing various classes of preparations, and (2) that in the opinion of the Branch the introduction of more preliminary notes, rather than their deletion is desirable. A third recommendation, concerning the deletion of the formula for elixir of pepsin and bismuth, was referred for consideration at the next meeting. Mr. Geo. W. Kutcher opened a third subject, "Governmental Revision of the Pharmacopœia," taking the affirmative, while Mr. Louis Saalbach spoke in the negative. The contestants presented strong arguments on their respective sides, bringing forward many excellent arguments for and against the proposition, which are promised for publication at a convenient date, but no ballot was taken and the question at issue remains unsettled.

March, 1910.—At the March meeting of the Branch attention was directed to the fact that the Pittsburg Branch has no assessed membership, and that consequently the current expenses during the past year were covered by contributions from 21 of its "loving friends." Attention was also called to the failure of the various pharmaceutical journals to publish accounts of the meetings of the Branch, and it was suggested by President Wallace that the Publicity Committee seek to remedy this lapse on the part of the journals. The Program Committee then submitted the following papers for discussion: "One Year's Accomplishment of the Pittsburg Branch," by B. E. Pritchard; "What I Know About Finance," by P. Henry Utech; "A Few Observations on Soft Elastic Capsules," by Louis Emanuel, Jr.; "Physician, Pharmacist and Proprietaries," by A. H. Riethmueller, M. D. These papers were read with one exception, that of Mr. Utech, who was unavoidably absent. The Program Committee submitted an interesting program for the April meeting of the Branch.

April, 1910.—The stated meeting of the Branch was held on the 12th of the month, the attendance being the largest in its history. The program submitted by the Committee for the evening's discussion was as follows: "Deceptively Advertised Proprietaries," by Dr. H. G. Blank; "The Relation of the Pharmacy Student to his Preceptor," by N. A. Grauer; "Some Pharmacy Not Taught in Our Schools," by P. Henry Utech; "A Forecast of the 1910 U. S. P. Convention," by Dr. J. H. Beal; "Symposium of Difficult Prescriptions" (with use of lantern slides), by Drs. Saalbach and Darbaker; "Moving Pictures Illustrating Industrial Scenes," by Dr. L. K. Darbaker. The different papers were well received and discussed after being read by Messrs. Beal, Utech, Willets, Kutscher,

Koch, Blumenschein, Emanuel, Holsopple, Wallace, Pritchard, and others. N. A. Grauer presented a voluntary paper upon the stability of some of the U. S. P. syrups, in which he recommended the elimination of sugar from the formula and replacing it with glycerin. A series of resolutions was presented from the City of Washington Branch with the request that they be endorsed by the Branch. On motion the matter was referred to the U. S. P. delegation.

CITY OF WASHINGTON BRANCH.

November, 1909.—The stated meeting of the Branch was held on the 3d of the month, and was devoted entirely to a "Discussion of Patent and Trade-Mark laws." The subject was introduced by Dr. Murray Galt Motter, who discussed the report of the Committee on Patents and Trade-Marks of the American Medical Association, pointing out that this report evidently written by some one thoroughly familiar with the several problems involved—presented the several questions in a clear and concise manner and was certainly well worth careful study on the part of everyone at all interested in the possibility of correcting the abuses that have developed out of the present laws as interpreted. Dr. F. E. Stewart, a member of the Committee referred to, in discussing the report of his committee presented some additional evidence in support of the conclusion therein presented. Mr. Samuel Hilton reported on the hearings on the "Mann Bill" and outlined its history, and Mr. Willard S. Richardson reported on the hearings that have been held on the "Currier Bill," which he hopes to see enacted into law, believing it to be in every way just and equitable. The question was discussed from various points of view by other speakers: Dr. Worth Hale, Dr. William H. Leaman, Prof. John Uri Lloyd, Dr. H. W. Wiley, and Messrs. M. I. Wilbert and Wymond H. Bradbury, whose remarks may be consulted in the A. Ph. A. Bulletin of January, 1910, p. 10-12.

December, 1909.—The stated meeting, held on the 1st of the month, was devoted to a discussion of "The Report of A. Ph. A. Committee on National Formulary." Mr. H. P. Hynson spoke of perfecting the N. F. and outlined what he believed that the book should be and what it should not be, as indicated in his letter to the Chairman appearing in the December Bulletin (pp. 472-474). Prof. H. E. Kalusowski, in his review of the report, commended many of the conclusions reached by the committee, mentioning in particular the objection to the deletion of certain introductory notes of instruction, but also directs attention to some oversights—such as misleading titles which would tend to bring the work of the Association into undeserved disrepute. Other speakers who spoke interestingly on the subject were Messrs. Augustus C. Taylor, Lewis Flemer, Lyman F. Kebler, S. L. Hilton, and H. W. Wiley, whose remarks are reported in the A. Ph. A. Bulletin of January, 1910 (pp. 12-16). Following

a suggestion made by Mr. Hynson, the president was on motion requested to appoint a committee of five to consider the several suggestions that were presented during the discussion and to report at the February meeting of the Branch. The following officers were then elected to serve for the year 1910: Samuel L. Hilton, President; Rodney H. True, First Vice-President; Henry E. Kalusowski, Second Vice-President; Miss Alice Henkel, Third Vice-President; M. I. Wilbert, Secretary; W. H. Bradbury, Treasurer.

January, 1910.—The stated meeting of the Branch, held on the 5th of the month, was devoted to a "Discussion of the Pharmacopœia of the United States," the discussion being opened by the Chairman of the Committee of Revision, Professor Joseph P. Remington. Mr. Geo. M. Beringer, discussed the scope of the book, and calling attention to the report of the A. Ph. A. Committee on the U. S. P., pointed out that this report represented the individual views of the members composing that committee and that no attempt had been made to harmonize the views of the several members. Professor Henry Kraemer discussed the importance of pharmacognosy in connection with pharmacopœial work and pointed out that in the U. S. P. fully 70 per cent. of the articles are more or less intimately dependant on plant drugs. H. H. Bartlett in discussing the nomenclature of the Pharmacopœia pointed out the desirability of uniformity in the titles of medicaments which should be made universal for all pharmacopœias. Professor Remington, opening the general discussion, took up the subjects thus presented, and gave a very interesting talk on these and other matters concerned in the forthcoming revision of the U. S. P. He was followed by Dr. H. W. Wiley, Dr. Reid Hunt, and Prof. Kalusowski in an equally interesting view, as will appear on consulting the report of this meeting in the A. Ph. A. Bulletin of February, 1910 (pp. 85-89).

February, 1910.—The meeting of the Branch, held on the 2nd of the month, was in accordance with the resolution at the December meeting devoted to the discussion of the "Report of a Special Committee on National Formulary." This report, as presented by the Chairman of the Special Committee, Mr. Lyman F. Kebler, appears *verbatim* in the A. Ph. A. Bulletin of March, 1910 (pp. 144-148), and should be consulted for the proper understanding of the several propositions acted on and endorsed at this meeting, which are here reproduced in full, as principles that, in the opinion of the City of Washington Branch, should govern the revision of the National Formulary:

Object.—The National Formulary should be a book of remedies which not only conserve and protect the welfare of the people, but also represent the best that the American Pharmaceutical Association stands for.

Nomenclature.—No name should be used which misleads in any particular.

Standards.—It is believed that it would be preferable to have a definite standard prescribed, when practicable, for each product recognized.

Division of Book.—It is unwise to divide the book into two parts.

Introductory Notes.—The National Formulary should include useful introductory notes, comments, etc.

Metric System.—The metric system alone should be employed in giving the quantity or proportion to be used in preparing the various products.

Medicinal Tipples.—All products which bear any form of stigma characterizing tipples should be eliminated.

Saccharin.—The use of saccharin as a sweetening agent for National Formulary products should be discouraged.

Pills.—The general direction for making and coating pills should be continued if it is found practicable to present the matter in an intelligible form.

Artificial Coloring.—The artificial coloring of official preparations should be discouraged; it is desirable, however, to introduce one or more formulas for preparing coloring solutions to be used when called for by prescriptions.

Preservatives.—Preservatives, other than such articles as alcohol and glycerin, should not be used in pharmaceutical preparations.

Basic Elixirs.—The introduction of several select basic elixirs is recommended.

Proprietary Medicines.—Formulas intended to produce an imitation of some proprietary product should not be included in the National Formulary.

Supplements.—Supplements, corrections and additions should be issued as the progress of pharmacy and medicine may demand.

The following recommendations were not concurred in by the majority of the members present, either because of a difference of opinion or because the subject matter itself has, as yet, not been sufficiently well discussed to permit of the expression of a definite opinion by many of the members present.

Synonyms.—The Committee believes that there should be introduced into the National Formulary as many synonyms as possible for the several preparations.

National Formulary a Book of Formulas.—The Committee is of the opinion that all simples should be embodied and described in the Pharmacopœia and that all mixtures and composites such as "Vegetable Cathartic Pills," "Compound Tincture of Cardamon," etc., should find a place in the National Formulary.

Druggists' Receipt Book.—The Committee expressed the belief that the only good purpose that such a book could serve is that of a repository for worthless, antiquated and defunct products. It is unable to see what possible value such a book would be to the progressive pharmacist.

Extemporaneous Preparations.—The Committee itself was undecided as to the advisability of preparing the various N. F. products extemporaneously, but expressed the opinion, evidently the majority, that it is the safer procedure to dilute fluidextracts with an appropriate solvent in the manufacture of a tincture than to prepare such tincture under conditions which are not as favorable as they might be.

Additions and Omissions.—The Committee believes that great liberality should be exercised along these lines because the National Formulary is to be used by people located in various sections of the country.

In view of the apparent difference of opinion regarding the possibility of harm resulting from "the use of saccharin," a resolution was passed to refer the matter to the Surgeon General of the Public Health and Marine Hospital Service with the request that it be made the subject of pharmacologic investigation.

March, 1910.—The stated meeting of the Branch, held on the 2nd of the month, was devoted to the discussion of subjects relating to "The

Forthcoming Revision of the Pharmacopœia." Dr. G. A. Menge discussing "The Melting Points" directed attention to some of the causes of divergence in melting-point determinations and suggested that in place of determining the melting "point" it would be better for the Pharmacopœia to direct that the range of melting be noted, as it is practically impossible to accurately define any one point in which all observers would agree. Dr. Atherton Seidell discussed "Solubility Factors" which have become more important with the acceptance of the Pharmacopœia as a legal standard. He discussed the general subject of solubilities and of solution and outlined the possible uses to which accurate information regarding this factor might be put. Dr. Norman Roberts pointed out that despite the fact that the U. S. P. requires about 54 of the official liquids to be "colorless," it is well known that such a thing as a "colorless liquid" does not exist in fact. Dr. Lyman F. Kebler, discussing the subject of "Hydrogen Dioxide," asserted that the points made by the previous speakers while interesting were important only from a theoretic point of view. The troubles that had been encountered by him were real, as explained in the course of his further remarks, leading to further discussion by a number of members and visitors present. An interesting criticism and review of the recommendations of the Branch Committee on the National Formulary was received from Mr. Otto Raubenheimer, in which he expressed his personal views on a number of questions not endorsed at the February meeting of the Branch, which may be consulted in the A. Ph. A. Bulletin (April, 1910, 214).

April, 1910.—The stated meeting of the Branch this month was devoted to the discussion of suggestions for general principles to be followed in revising the Pharmacopœia of the United States, and resulted in the adoption, without a dissenting vote, of the following resolutions defining what in the opinion of the Branch should constitute the function and scope of the work; these to be submitted to the Pharmacopœial Convention;

WHEREAS, It has been recommended that the Pharmacopœia of the United States be recognized and used as the basis for medicinal prescribing; and

WHEREAS, It has been recommended that medical colleges use the Pharmacopœia as a text-book, or book of reference for students; now, therefore, be it

Resolved, That the Pharmacopœia should be a compilation of the acceptable standards for desirable medicaments of known and recognized value; and be it further

Resolved, That the United States Pharmacopœial Convention, to be held in Washington, May 10, 1910, be requested seriously to consider the adoption of the following rules for general principles to govern admissions to and deletions from the Pharmacopœia of the United States.

1. That drugs which possess no well-recognized medicinal value be not included in the U. S. P.

2. That the duplication of drugs having essentially the same medicinal action be discouraged.

3. That drugs which are fully represented by an official active principle be omitted from future editions of the U. S. P.

4. That substances which are of but secondary importance as drugs and are used primarily as foods be not retained.
5. That whiskey and alcoholic beverages be deleted from the U. S. P.
6. That substances which have no direct therapeutic value and are used as solvents or reagents be included in the appendix.
7. That the unnecessary duplication of Pharmaceutical preparations such as wines, vinegars, tinctures and fluidextracts of the same drugs be discouraged.
8. That the continuing of fixed formulas for complex mixtures be discouraged.
9. That all formulas for preparations that can be made extemporaneously be recommended for admission to the National Formulary.
10. That all complex preparations not provided for by international treaties be relegated to the National Formulary.
11. That further efforts be made to establish and adopt international nomenclature and standards for drugs and preparations.
12. That compounds and mixtures permanently controlled either by secrecy or proprietary rights be not admitted to the U. S. P.

In the course of the discussion preceding the adoption of the above resolution, attention was called to a number of communications, which had been received, bearing on these resolutions, and that many of these, coming from representative individuals, were in harmony with the resolutions adopted by the Branch. Those participating in the discussion during the meeting were: Messrs. Murray Galt Motter, Reid Hunt, M. F. Finley, M. I. Wilbert, W. M. Barton, L. F. Kebler, Drs. Magruder and Seidell, Prof. Kalusowski and Mr. Flemer.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS 1909.

In the following no attempt has been made to give a synopsis of the proceedings of the State Pharmaceutical Associations. It is confined to the dates of the meetings, the names of the executive officers and to the titles of the original papers read, with the names of their authors, in accordance with information gathered from the official proceedings that have been received by the reporter. It may be noted that less than one half of the State Associations have complimented this Association with their printed proceedings of meetings held during 1909. *Note* also, that the papers marked with an asterisk (thus *) have been abstracted for this report.

Alabama.—The Twenty-Eighth Annual Meeting of the Alabama Pharmaceutical Association was held at Gadsden, June 9 and 10, 1909. Lee Whorten, of Gadsden, was elected President; W. E. Bingham, of Tuscaloosa, Secretary.

The following papers were presented at this meeting:

"State Pharmacy Laws," by E. H. Cross.

"A Personal Experience on the U. S. P. and N. F. Products," by D. H. Fulton.

"How to Bring the Druggists Closer Together," by Mrs. J. T. Roe.

"My Method of Popularizing N. F. and U. S. P. Preparations also an Answer to a Paper by A. V. Kaczoroski, read at Louisiana Pharmaceutical Association, 1909," by W. P. Thomason.

"The Doctor and Proprietaries," by Dr. Murphree.

Arkansas.—The Twenty-Seventh Annual Meeting of the Arkansas Association of Pharmacists was held at Pine Bluff, May 11, 12 and 13, 1909. O. O. Lumpkin, of Pine Bluff, was elected President; Miss Mary A. Fein, Secretary-Treasurer.

The following papers were read at this meeting:

"The Relationship of the Arkansas State Pharmacy Board to the Arkansas State Pharmaceutical Association," by F. B. Hurle.

* "Wild Cherry Bark," by Henry Weimar. *

* "Syrup Phosphates Compound, N. F. (Chemical Food)," by A. C. Parse.

"Are We as Pharmacists Doing Our Duty in the Prevention of Tuberculosis?" by Dr. Eugene Winkler.

Connecticut.—The Thirty-third Annual Meeting of the Connecticut Pharmaceutical Association was held at New Haven, June 15 and 16, 1909. Patrick J. Garvin, of Bethel, was elected President; John B. Ebbs, of Waterbury, Secretary.

The following paper was read:

"The Pharmacopœia," by Martin T. Meyer.

Illinois.—The Thirtieth Annual Meeting of the Illinois Pharmaceutical Association was held at Quincy, June 15 to 17, 1909. W. D. Duncan, of Ottawa, was elected President; W. B. Day, Chicago, Secretary.

No individual papers were presented at this meeting.

Indiana.—The Twenty-eighth Annual Meeting of the Indiana Pharmaceutical Association was held at French Lick Springs, June 22 to 24, 1909. Burton Cassaday, of West Terre Haute, was elected President; Maurice P. Schwartz, of Indianapolis, Secretary.

The following papers were read at this meeting:

"The Pharmacist as a Citizen," by Dr. J. N. Hurty.

"Money-Making Devices in a Drug Store," by Professor Gertler.

"Legislation," by J. M. Barrett.

"Recreation—Does the Druggist Need it?" by J. R. Mutz.

"The Practical Operation of Soda Fountains, With Reference to Syrups, Crushed Fruits and their Preparations," by Prof. H. E. Barnard.

"Random Thoughts," by Leo Eliel.

Kansas.—The Thirtieth Annual Meeting of the Kansas Pharmaceutical Association, was held at Independence May 25, 26 and 27, 1909. A. E. Topping, of Overbrook, was elected President; Robert Lowman, of Pittsburg, Secretary.

No individual papers were presented at this meeting.

Kentucky.—The Thirty-Second Annual Meeting of the Kentucky Pharmaceutical Association was held at Cerulean Springs, June 15, 16 and 17, 1909. George L. Tenny, of Stanford, was elected President; J. W. Gayle, of Frankford, Secretary.

The following papers were presented at this meeting:

"Should Druggists Discourage the Sale of Morphine, Cocaine, Opium and their Derivatives?," by William J. Johnston.

"Collection of Odd Orders and Remarks on Same," by Marvin D. Averill.

"What Position Should Druggists Take Relative to State-Wide Prohibition. How Should it Affect Business?," by Leon Evans.

"Should Our State Pharmacy Law Be Repealed, and Should we have Registered Assistants and Apprentices Incorporated in a New Measure?," by J. W. Gayle.

"The Directoire Gown," by Mrs. Dr. Leathers.

"The Druggist's Wife," by Eleanor Diehl.

Maine.—The Forty-Second Annual Meeting of the Maine Pharmaceutical Association was held at Portland, June 29 and 30, 1909. John Coughlin, of Augusta, was elected President; Dr. M. L. Porter, Secretary and Treasurer.

The following paper was read at this meeting:

"The Pharmacist and the Physician," by Dr. Horace Fox.

Minnesota.—The Twenty-Fifth (the Silver Jubilee) Annual Meeting of the Minnesota State Pharmaceutical Association was held at Tonka Bay, June 16, 17 and 18, 1909. A. D. Thompson, of Minneapolis, was elected President; Theo. F. Leeb, of Winona, Secretary.

The following papers were presented at this meeting:

"The New College of Pharmacy Building," by Frederick J. Wulling.

"The College of Pharmacy of the University of Minnesota—Historical. (An Annual Contribution, continued from 1908)," by Dean Wulling.

"The Proprietary" (so-called), by Theo. F. Leeb.

* "Digitalis," by Edgar D. Brown, M. D.

Missouri.—The Thirty-First Annual Meeting of the Missouri Pharmaceutical Association was held at Joplin, June 15, 16, 17 and 18, 1909. W. K. Ilhardt, of St. Louis, was elected President; Henry M. Whelpley, Permanent Secretary.

The following papers were read at this meeting:

"Can Drug Store Hours be Shortened and Sunday Closing Extended?" two papers, by H. O. A. Huegel and by F. G. Uhlich.

"General Replies to Questions Submitted by Committee on Papers and Queries," by J. G. Geiwitz.

"Our Past Presidents," by F. R. Dimmitt.

"Suggestions on Membership," by Charles E. Meyer.

"The 1883 Meeting," by H. M. Whelpley.

"Suggestions Wanted for Our New Board of Pharmacy," two papers, by Francis Hemm and by H. W. Servant.

* "Mexican Medicine," by J. F. Llewellyn.

"What Constitutes a Reputable College of Pharmacy from the View-point of the Missouri Pharmaceutical Association?" by Leo R. Suppan.

"The 1884 Meeting," by H. M. Whelpley.

"Is Commercial Instruction in Our Colleges Doing Good?" by L. Lieberstein.

"The U. S. P. Alkaloids and Their Salts," two papers, by Francis Hemm and by William Mittelbach.

"A Few Alkaloids," by Otis W. Smith.

"Cinchona Alkaloids," by H. M. Pettit.

"Trade Interests," by W. F. Ittner.

"Missouri Pharmacy Law," by A. Brandenberger.

* "The National Formulary," by Mrs. D. V. Whitney.

"Answers to Queries," by H. A. Kattelman.

New Hampshire.—The Thirty-Sixth Annual Meeting of the New Hampshire Pharmaceutical Association was held at The Weirs, June 29 and 30, 1909. Edwin M. Allen, of Canaan, was elected President; Herbert E. Rice, of Nashua, Secretary.

The following papers were read at this meeting;

"What's the Matter with the Drug Business of To-day?," by Herbert E. Rice.

"The Propaganda," by Herbert E. Rice.

New Jersey.—The Thirty-Ninth Annual Meeting of the New Jersey Pharmaceutical Association was held at Lake Hopatcong June 9, 10 and 11, 1909. George H. Horning, of Roselle Park, was elected President; Frank C. Stutzlen, of Elizabeth, Secretary.

The following papers were presented at this meeting:

* "Capsella Bursa Pastoris," by Dr. P. Hommell.

* "Compound Tincture of Gentian," by B. Hulick.

* "Notes on Volatile Oils of the U. S. P.," by Chas. H. LaWall.

"Official Synonymy," by Geo. M. Beringer.

* "Ointments and Cerates," by Geo. H. White.

* "Plasters of the Pharmacopœia," by F. B. Kilmer.

* "Should Phenolphthalein be Recognized by the U. S. P. as a Therapeutic Agent?," by Dr. P. E. Hommell.

"Some of the Improvements Proposed in the Revision of the National Formulary," by Geo. M. Beringer.

* "Some of the Syrups of the U. S. P. and N. F.," by Geo. M. Beringer and G. M. Beringer, Jr.

* "Suggestions for the Ninth Revision Committee of the U. S. P.," by A. F. Marquier.

* "Syrup of Hoarhound," by Geo. M. Beringer.

- * "The Rapidity of Volatilization of Camphor," by Chas. H. LaWall.
- * "The Self Adjusting Pill Roller and Finisher," by Walter Ruch.
- * "The Senna Syrups," by Dr. P. E. Hommell.
- * "Troches That Are Official and Some That Should Be," by Geo. M. Beringer and H. D. Kresge.

North Carolina.—The Thirtieth Annual Meeting of the North Carolina Pharmaceutical Association was held at Greensboro, June 23, 24 and 25, 1909. G. Y. Watson, of Southport, was elected President; P. W. Vaughan, of Durham, Secretary.

The following papers were read at this meeting:

- "Answers to Queries," by William Niestlie.
- "Drug Store Advertising," by ———?
- "The Future of Pharmacy," by Alfred J. Ashford.

Ohio.—The Thirty-First Annual Meeting of the Ohio State Pharmaceutical Association was held at Cedar Point, July 13, 14 and 15, 1909. C. S. Ashbrook, of Mansfield, was elected President; Theo. D. Wetterstroem, of Cincinnati, Secretary.

The following papers were read at this meeting:

- * "Alkaline and Antiseptic Solution," by H. V. Army.
- * "Asafetida Powder," by Azor Thurston.
- * "A Few Observations at the Prescription Counter," by W. Kaemerer.
- * "Formaldehyde Tests," by George D. Beal.
- * "The Drug Store Cow," by Joseph Feil.
- * "Pharmacy as a Science," by L. H. Witte.
- "Should Drugs Furnished by Doctors be Required to Comply with Legal Standards?" by C. M. Shafer.

Pennsylvania.—The Thirty-second Annual Meeting of the Pennsylvania Pharmaceutical Association was held at Bedford Springs, June 22, 23 and 24, 1909. John C. Wallace, of New Castle, was elected President; Edgar F. Heffner, of Lock Haven, Secretary.

The following papers were read and presented at this meeting:

- "Answer to Query 8 (Regarding the Lawful Use of Synthetics for Preparing Flavoring Extracts)," by Louis Saalbach.
- "A Window Display," by Frank H. Cope.
- "A Visit to the World's Largest Drug Factory," by James S. Gleghorn.
- "Concerning the Increase of Proprietary Preparations," by B. E. Pritchard.
- * "Confirmation of Saccharin in Foods and Beverages," by F. A. Genth, Jr.
- * "Elixir of Gentian, N. F.," by George M. Beringer.
- * "Fresh Belladonna Leaves," by J. G. Roberts.
- * "Formulas for Some New Basic Elixirs," by George M. Beringer.
- "Giving References to Employees," by William G. Greenwalt.

"Lest We Forget," by C. Lewis Diehl.

* "Moisture in Alum, Dried and Powdered," by Willard R. Graham.

"Professional Courtesy," by W. I. Siegfried.

"Pages From the Scrap Book of a Country Druggist," by Charles E. Willets.

"Proprietary Preparations," by William M. Latou.

"Query No. 49 (Regarding Penalty for Violation of the Law Regarding the Sale of Habit-forming Drugs)," by Henry C. Blair.

"Query No. 25 (Can a Druggist Properly Solicit Chemical Laboratory Work Direct from the Public)," by Henry C. Blair.

"Query No. 21 (Regarding the Retention in the U. S. P. and N. F. of Preparations Containing Small Amounts of Narcotics which are largely used popularly)," by Henry C. Blair.

"Query No. 26 (What is the Best Way to Discourage the Sale of Tincture of Jamaica Ginger on Sundays Without Offending the Neighborhood Patrons?)," by R. H. Lackey.

"Query No. 45 (Regarding the Detriment or Advantage of Pharmacopœial Revision Every Five Years)," by R. H. Lackey.

"Queries No. 16 and No. 17 (Regarding the Impracticability on Economical and Educational Grounds of Pharmacists Assaying and Standardizing Their Own U. S. P. Preparations)," by Leo Eliel.

"Query No. 47 (Regarding the Stimulus Necessary to Induce the Stay-at-home Druggist to Attend the Meetings)," by Franklin M. Apple.

"Query No. 10 (Regarding the Suitability of Commercial Exsiccated Sodium Phosphate to Prepare Liquor Sodii Phosphatis Compositus U. S. P.)," by Henry A. Bradshaw.

"Query No. 36—What Efficient Plan Can be Devised for Suppressing the Increase of Proprietary Preparations?" by R. H. Lackey.

"Query No. 27 (Regarding the Preparation and Supply of Certain Extracts and Essences for Grocers' Trade)," by H. F. Ruhl.

"Standardization the Foundation of Professional Pharmacy," by F. E. Stewart.

* "Some of the Properties of Cadmium," by H. C. Demming.

* "The Fluidextract Question," by F. J. Blumenschein.

"The Pharmaceutical Journals," by B. E. Pritchard.

"The House Divided," by J. Leyden White.

* "The Solubility of Official Substances," by M. I. Wilbert.

"Taking Care of Stock and Cost," by George W. Kutscher.

"The Shut-Ins in Drug Stores," by William G. Greenwalt.

* "The Detection of Bombay Mace," by James W. Gadhil.

"The Commencement of Business," by J. B. Moore.

"The Quality of Pharmaceuticals," by W. A. Pearson.

"The Copyright, Patent and Trade-mark Question," by F. E. Stewart.

"The Policies of the N. A. R. D.," by Secretary T. H. Potts.

"Use and Abuse of Free Dispensaries," by J. B. Holsopple.

"What Constitutes a Pure Drug Standard," by Louis Emanuel.

* "Zinc Oleate and Zinc Stearate," by E. Fullerton Cook and P. C. Dosch.

* "U. S. P. Exsiccated Salts and Their Preservation," by Charles H. LaWall.

South Dakota.—The Nineteenth Annual Meeting of the South Dakota Pharmaceutical Association was held at Lead, August 18, 19 and 20, 1909. J. Deetken, of Deadwood, was elected President; E. C. Bent, of Dell Rapids, Secretary.

The following papers were read at this meeting:

"A Few Don'ts in a Drug Store," by E. C. Bent.

"Why I Attend the Pharmaceutical Association," by Mrs. D. F. Jones.

"The College Boy and His Relation to the Pharmaceutical Association," by Prof. B. T. Whitehead.

"The Relation That Should Mutually Exist Between the Druggist and Physician," by Dr. J. W. Brackett.

"Should or Should Not a Druggist Allow a Patent Medicine Concern to Use his Name in Advertising their Nostrums?" by Julius Deetken.

"How Can Our Association Aid the Pharmacy Department at Brookings State College?" by James Lewis.

"What Are the Necessary Qualifications for an Ideal Prescription Pharmacist?" by C. L. Stillman.

"Of Interest to Physicians and Pharmacists," by Dr. Waldron.

Tennessee.—The Twenty-Fourth Annual Meeting of the Tennessee Pharmaceutical Association was held at Sewanee, July 20, 21 and 22, 1909. W. I. Gates, of Whiteville, was elected President; E. F. Trolinger, of Nashville, Secretary.

The following papers were read at this meeting.

"Some Notes on Tincture of Citro-Chloride of Iron N. F.," by E. A. Ruddiman.

"The Practical Operation of Soda Fountains with Reference to Syrups, Crushed Fruits and Their Preparations," by H. E. Barnard.

"Shorter Hours and Sunday Closing," by W. I. Gates.

"Druggists' and Doctors' Relation, and What Should be Done by Each to Induce Harmony," by O. J. Nance.

"School for Employees—Training Our Helpers," by Iliff Conger.

"Excessive Prices on Proprietaries and How Best to Bring Them Lower," by Ernest Finch.

"Druggists Making and Selling Their Own Preparations," by George S. Alcorn.

"The Close Confinement of the Druggist's Life and Its Mental and Physical Effects," by W. I. Gates.

Texas.—The Thirtieth Annual Meeting of the Texas Pharmaceutical Association was held at San Antonio, June 15, 16 and 17, 1909. R. H. Walker, of Gonzales, was elected President; E. G. Eberle, of Dallas, Secretary Treasurer.

The following paper was read at this meeting:

"Some Clerks I Have Known," by W. H. Cousins.

Vermont.—The Sixteenth Annual Meeting of the Vermont State Pharmaceutical Association was held at Lake Bomoseen (Castleton), June 22, 23 and 24, 1909. Arthur L. Cheney, of Morrisville, was elected President; W. E. Terrill, of Montpelier, Secretary.

The following papers were read at this meeting:

"Legitimate Pharmacy versus Proprietaries," by Lucien J. Trudel.

"Should the Druggist Handle Liquors When He Has the Legal Right to Do So, and How Does It Affect the Business?" by F. J. Kinney.

West Virginia.—The Third Annual Convention of the West Virginia State Pharmaceutical Association was held at Morgantown, June 3 and 4, 1909. Arch. Kreig, of Charleston, was elected President; F. S. Johnston, of Elkins, Secretary.

The following papers were read at this meeting:

"On Narcotics and Alcohol," by R. W. Snavely.

"The Professional and Commercial Sides of Pharmacy," by Walter E. Dittmeyer.

"The Pharmacist vs. the U. S. Internal Revenue Department," by B. E. Pritchard.

Wisconsin.—The Twenty-ninth Annual Meeting of the Wisconsin Pharmaceutical Association was held at Elkhart Lake, June 22 to 25, 1909. F. M. Charlesworth, of Kaukauna, was elected President; E. B. Heimstreet, of Janesville, Secretary.

The following papers were presented at the meeting:

"Druggists Versus Tuberculosis," by Otto J. S. Boberg.

"Pharmacy, Commercial or Scientific," by W. F. Kaiser.

"Should a Druggist Allow His Name to be Used in Advertising Patent Medicines?" two papers, by Fred. G. Wiechmann and by M. C. Trayser.

"A Home-made Still," by A. R. Eberle.

"Sunday and Early Closing," by J. K. Stephany.

"The Help Problem and How to Solve It," by Max R. Zaegel.

PHARMACY.

A. APPARATUS AND MANIPULATION.

Titration—Simple Device to Prevent Over-Titration.—In order to prevent over-titration in rapid work, F. Schulz places a piece of tube of 12 to 15 Mm. bore and open at both ends in the liquid to be titrated; this temporarily separates a portion from the reagent that is run in, and titration can be carried at once to a point at which the color is completely changed. By agitation the liquid in the tube is then mixed with the remainder, when the original color returns, and the few drops necessary to finish the titration are cautiously added.—Pharm. Journ. and Pharmacist, Febr. 12, 1910, 173; from Chem. Ztg., Nov. 9, 1909, 1187.

Burettes.—New Forms.—W. Meysahn has devised two new forms of burettes, constructed entirely of glass and possessing pronounced advantages in the arrangement for regulating the outflow, which are clearly depicted in the accompanying cuts. These burettes (Figs. 1 and 2) are distinguished from the ordinary form by having the outflow through an elongated conical glass stopper, accurately ground and fitted so as to protrude from the nether end of the glass burette tube, which is calibrated and graduated as usual. The stopper in Fig. 1 is perforated centrally from above towards the middle and the perforation is then deflected laterally, and from below upward to within a short distance of the downward perforation, and then also deflected laterally, the lateral openings thus produced being coincident with a groove cut into the wall of the burette-tube. For convenience in fingering, the projecting end of the tapering stopper is slightly bulged out, the details being shown by Fig. 2. By a simple turn of the stopper a full flow from the burette may be established or it may be reduced to drops at greater or less intervals, or cut off completely. When empty, the stopper may be removed by reversing the burette and pressing upon it, and the instrument then conveniently and thoroughly cleaned. The second form is shown by Fig. 3. In this the glass stopper is not perforated, but is provided with a groove coincident to the lateral outlet attached to the body of the burette, as shown in detail by Fig. 4. To facilitate the fingering of the stopper, a hard rubber disk is provided, which may be slipped over the stopper and removed again easily when it is necessary to cleanse the burette.—Pharm. Ztg., liv (1909), No. 64, 623, and No. 82, 812.

Pharmaceutico-Chemical Burette — An Instrument of Precision. — Gustav Müller supplies a new form of burette (shown by Fig. 5) which is intended particularly for pharmaceutico-chemical titration directed in the volumetric operations of the G. P., in which it is important that the end

BURETTES.

35

FIG. 1.



FIG. 2.



FIG. 3.

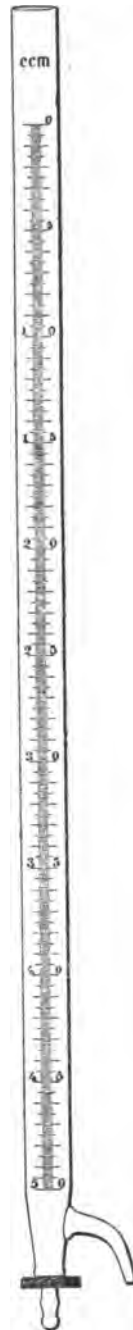
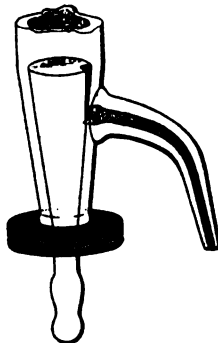


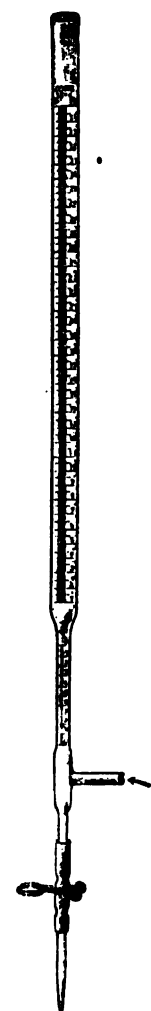
FIG. 4.



Burettes.

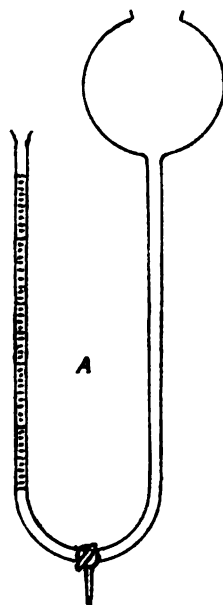
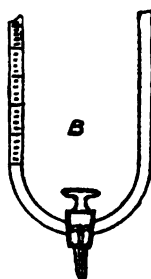
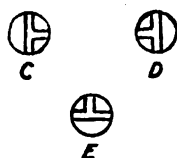
of the reaction can be determined with absolute precision. This burette is graduated with great accuracy, the upper, wider part of the tube into cubic

FIG. 5.



New Form of
Burette.

FIG. 6.



Reservoir Burette.

centimeters, the lower, constricted part (having a total capacity of 1 Cc.) being divided into graduations of $\frac{1}{10}$ cubic centimeters. The zero is im-

mediately below the transition from the upper wider to the lower narrower tube, the graduation into whole cubic centimeters being upward from the zero and downward for the $\frac{1}{10}$ cubic centimeters.—Pharm. Ztg., lv (1910), No. 30, 305.

Reservoir Burette—Simple Construction.—P. B. Dallimore describes a simple reservoir burette, the details of which are shown by *a*, *b*, *c*, *d* and *e* in Fig. 6. It is made in the form of a U-tube, one arm constituting the burette, the other having a globular reservoir blown at the top, as shown by *a*. The tap connecting the arm may be of two kinds: *First*, a hollow three-way tap set upright, as shown in *b*. In this case the tap itself forms the spout of the burette. *Second*, a three-way tap, shown in different positions, depending on the use, by *c*, *d* and *e*. This tap has one hole drilled right through and another drilled half-way through, leading into the first hole at right angles. If this one is used, the burette must be made with a spout, as shown by *a*, and this is considered preferable to the use of a tap only, as shown by *b*, for it is easier to titrate with a tap in the front than with one set between the two limbs of the burette. The tap is in position *d* when filling reservoir; in position *e* when filling the burette, and in position *c* when running off a titration, while all connections are shut off by turning the tap at an angle from the "on" position to the "off" position.—Pharm. Journ. and Pharmacist, Aug. 14, 1909, 235.

Burettes and Clamps—Improved Forms.—Dr. Bertheim has devised a new burette clamp, shown in the accompanying cut (Fig. 7), which presents the advantage that the entire scale is visible, no portion being covered by the clamp itself. The clamping is effected by applying the principle of the set-screw, a simple turn of which exerts the pressure on the verticle surface of the clamp necessary to hold the burette in position.

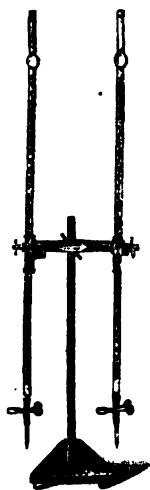
An improvement of the burette consists in its expansion near the top (above the graduation) into a bulb, flattened on one surface and frosted by grinding, so that characters may be written on it with a pencil. This improvement is plainly shown by (Fig. 8). Pharm. Ztg. LV. (1910), No. 13, 127.

Burette Holder—Convenient Form.—Kuntze has constructed a new and convenient form of burette holder (Fig. 9) by interposing the extensible arm *A* between the clamps holding the burette and the sliding clamp on the upright support. The utility of this device is obvious, since the position of the burette may be changed at will by drawing out or compressing the extensible arm. Pharm. Ztg. LIV (1909), No. 99, 975.

Hygienic Pipette—A Practical Construction.—Dr. Meysahn has devised the pipette shown by (Fig. 10) which presents a form commendable on sanitary and hygienic considerations. It consists of an ordinary pipette having a syringe-like extension fused to the upper extremity, which is pro-

vided with a close-fitting leather plunger by means of which the suction necessary to fill the pipette to the mark is effected. The device is protected by a German patent. Pharm. Ztg. *LIV* (1909), No. 82, 811.

FIG. 7.



Burettes and Clamps.

FIG. 8.

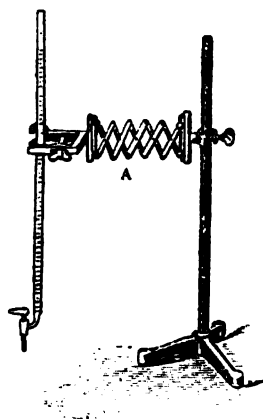


FIG. 10.



Hygienic Pipette.

FIG. 9.



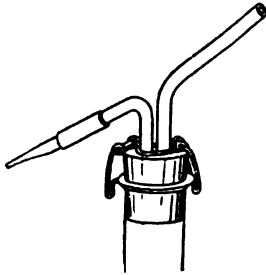
Burette Holder.

Spritz-Bottles.—Clamps for Securing Stopper. E. A. Schott recommends the device shown by Fig. 11 for securely holding the stopper in spritz-bottles, which he has found useful when operating with hot liquids

or when it is desirable to run more than ordinary pressure for projecting the liquid. The illustration requires no further description. Pharm. Ztg. liv (1909) No. 82, 811.

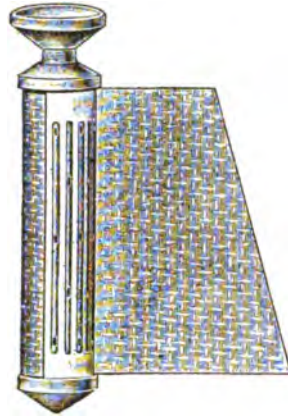
Solubilities of Official Substances.—Definition. M. I. Wilbert suggests

FIG. 11.



Spritz-Bottles.

FIG. 12.



Quick-Pressure Filter.

the inclusion in the U. S. P. of the following definitions of the common terms used to denote solubilities :

100 Cc. of solvent will dissolve:

100 Gm. or more of a—"very soluble" substance.

10 Gm. to 100 Gm. of a—"freely soluble" substance.

1 Gm. to 10 Gm. of a—"soluble" substance.

0.1 Gm. to 1 Gm. of a—"slightly soluble" substance.

0.01 Gm. to 0.1 Gm. of a—"very slightly soluble" substance.

0.001 Gm. to 0.01 Gm. of a—"nearly insoluble" substance.

Less than 0.001 Gm. of a—"practically insoluble" substance.

Exact information regarding solubilities, Mr. Wilbert states, could be tabulated in the appendix, as is done in the Belgium Pharmacopœia. Proc. Penna. Pharm. Assoc. 1909, 332-333.

Quick-Pressure Filter—New Form.—Albert Kahlert Co. supply an ingenious quick-pressure filter consisting of a hollow cylinder with numerous perforations, which in use are covered with filter paper, the method of applying the filter paper being shown by Fig. 12, of holding the filter in place by means of rubber bands by Fig. 13, and the filter in use by Fig. 14, all of which is quite simple and needs little explanation. The filter cylinder being in cylindrical funnel, the syphon-tube is inserted and held air-tight in the upper orifice of the filter-tube by means of a rubber stopper. Suction is produced by means of the bulb in the syphon-tube and a flow

of liquid from the container is then continuously established, the rate of flow depending on the rapidity with which the liquid passes through the filter, which, in turn, depends on the length of the syphon-tube. The advantages are obvious. Filtration goes on automatically and rapidly, the filter-paper is economically utilized, and there is no loss of liquid by evaporation.—Pharm. Ztg., lv (1910), No. 34, 346.

Continuous Filtration—A Home-made Device.—"A Reader" has devised a continuous filter which consists of an inverted "flower-pot" with a piece of muslin tied over the mouth and a rubber syphon tube attached to a section of glass tubing inserted by means of a perforated cork into the hole at the bottom of the pot. The arrangement is shown by Fig. 15. The syphon-filter rests in a funnel inserted into the mouth of a receiving

FIG. 13.



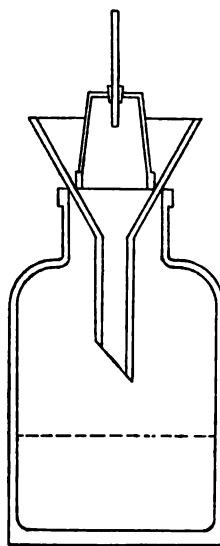
Quick-pressure Filter.

FIG. 14.



Continuous Filtration.

FIG. 15.



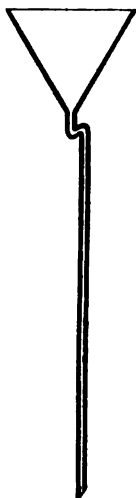
bottle, and the flow of liquid having been started continues until the liquid to be filtered is exhausted by the syphon from the vessel containing it.—Drugg. Circ., Aug., 1909, 405.

Filtration through Wadding.—A Practical Suggestion.—Von Heygendorff observes that if cotton wool or similar material is employed as a filtering medium, a small wad is very apt to slip down into the tube of the funnel and make filtration very slow. This may be prevented by putting a small Gooch filtering cone in the funnel underneath the wad, but the latter is then rather apt not to fit closely to the funnel, but to become packed together in the cone and allow some precipitate to pass. Both

difficulties are overcome by using two Gooch cones, the wool being placed between them, and the upper one being larger and heavier than the lower. Pharm. Journ. and Pharmacist, Febr. 12, 1910, 173; Pharm. Chem. Ztg. Nov. 9, 1909, 1187.

Quick Filter Funnel.—Novel Modification.—Dr. E. Murmann has constructed a funnel for quick filtrations which obviates the necessity of the long constricted funnel tubes usually employed for accelerating the flow of filtrates. The device, as shown by Fig. 16 consists of a knee-shaped bend of the tube just below the cone of the funnel, which is so adjusted as to cause a slight upward flow of the liquid during its passage from the filter. This causes the production of small air spaces and consequent suction, which very efficiently accelerates the flow of liquid. It is import-

FIG. 16.



Filtration Through Wadding.

FIG. 17.



Quick-Filter Funnel.

ant that the upward incline in the knee shall be about and not exceed the inner diameter of the funnel tube. The device is patented in Germany. Pharm. Ztg. lv (1910), No. 21, 213.

Filter-Spiral.—A Substitute for the Hot-Water Funnel.—H. Stoltzenberg has devised and recommends the filter-spiral shown by Fig. 17, which is constructed of thin glass tubing, as a substitute for the usual hot-water funnel for the filtration of hot liquids. The spiral is suspended in a beaker into which it fits snugly, a plaited filter is introduced, and the hot liquid poured into the filter. Filtration proceeds rapidly without danger of cooling, the surrounding steam keeping both the spiral and the filter quite warm to the end of the filtration. Pharm Ztg. liv (1909), No. 64, 623; from Chem. Ztg. 1909, No. 81.

Funnels with Shoulder—A Useful Device.—Klimach & Co. have introduced funnels provided with a shoulder at the lower extremity of the cone, which holds them rigidly in an upright position when introduced into the mouth of bottles or jars. They are constructed of tinned iron (Fig. 18)

FIG. 18.



FIG. 19.



Funnels with Shoulder.

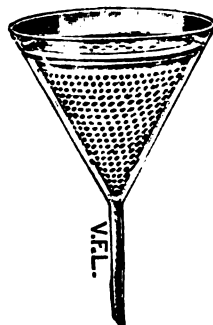
and glass (Fig. 19) and require no further explanation.—Pharm. Ztg., liv (1909), No. 91, 900.

Perforated Funnel Cone—Construction of Porcelain.—Dr. Rewald has

FIG. 20.



FIG. 21.



Perforated Funnel Cones.

introduced the perforated porcelain funnel cone, shown in its application by Figs. 20 and 21. The cone is flanged outwardly at the upper ex-

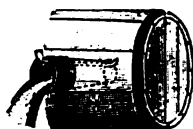
trernity and provided near the pointed extremity with three projections which insure its position from contact with the walls of the funnel into which it is fitted. The utility of the cone, which may be used for ordinary filtrations (Fig. 21) or for suction filtrations, is obvious. In either case, the filter-paper is introduced smoothly into the cone, but in operations with the suction pump the cone is fitted with a rubber ring at the upper extremity, as shown by Fig. 20. The collection and washing of precipitates, however dense or heavy, is greatly facilitated by the intervention of these cones, and ordinary filtrations are greatly accelerated.—Pharm. Ztg., liv (1909), No. 99, 976.

Bung-Funnel.—Practical Construction.—Aug. Wohlfart has devised and supplies the convenient contrivance shown by Figs. 22 and 23, which has

FIG. 22.



FIG. 23.



Bung-Funnel.

FIG. 24.



Carboy Nozzle.

FIG. 25.

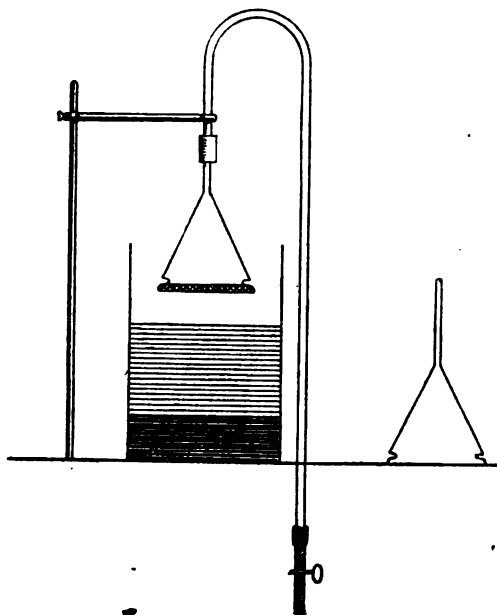


proven very serviceable for filling and emptying barrels through the bungs into which, owing to its conical form, it is easily adjusted irrespective of variations in size. These funnels are constructed of zinc or other desirable metal, and are provided either with a partial jacket or enclose an air tube so that in filling air may pass out, and in emptying air may enter without bubbling through the liquid or spurting. Pharm. Ztg. liv (1909), No. 82, 812.

Carboy Nozzle.—A Practical Device.—Schmidt and Brösel supply a new carboy nozzle which serves admirably for emptying acid carboys of their contents without danger from spurting. As shown by Figs. 24 and 25 it consists of a cap, the part A (Fig. 24) being of soft, elastic rubber, while the extremity of the cap, composing the nozzle, is constructed of hard rubber, and bears a hard-rubber bent tube which extends well into the neck of the carboy-bottle and admits the air necessary to replace the space of the overflowing acid. Pharm. Ztg. lv (1910), No. 40, 409.

Syphon-Funnel—Convenient form for Decantations from Precipitates.—Dr. Ernst Richter calls attention to the tie-over funnel shown in outline by the accompanying drawing (Fig. 26), which, when the mouth is tied over with a suitable filter material (such as a four-fold layer of gauze), affords an efficient attachment to the syphon used for decantation from precipitates—such as ferric hydroxide, for example. The funnel is attached by means of rubber tubing to the short limb of the syphon, the long limb of which is provided with a rubber extension and pinch-cock—the short limb being adjusted by the aid of a clamp sliding on a vertical

FIG. 26.



Syphon-Funnel.

rod and held in place by a set screw. The use and method of application is obvious. When the liquid has been decanted to within 1 Cm. of the precipitate, the syphon is closed at the long limb, and the fresh wash water is added without removing the syphon, which is again ready for action when the precipitate has settled sufficiently.—*Apoth. Ztg.*, xxiv (1910), No. 92, 871.

Syphons—Construction on a New Principle.—E. Neugebauer describes two forms of syphons which are constructed on an entirely new principle, as shown by Figs. 27 and 28. The glass syphon (Fig. 27) is composed practically of two syphons, *b a c* and *b d e*, which are joined at *b*, and it functionates on immersing the smaller of the two (*b d e*) completely into

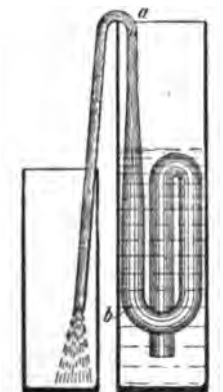
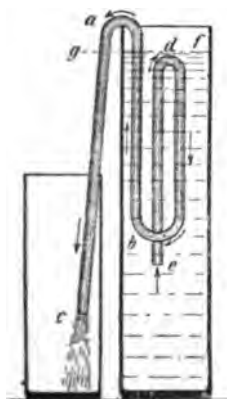
and beneath the surface of the liquid (f) in consequence of the vital force imparted to the fluid by its downward passage from d to b . This vital force is further augmented by lengthening the tube $d b$, and also by increasing the diameter of the same, as shown by Fig. 28, in which the greater diameter of the smaller syphon increases the lifting power and rapidity of outflow very materially. The only essential condition is that the smaller syphon shall be completely covered by the liquid in starting the operation. If it is desirable to facilitate the removal of the filled syphon, the end of e should be bent upwards.—Pharm. Ztg.

Safety Siphon—Efficient Construction.—Dr. Matton has devised the siphon which efficiently prevents the suction of liquids into the mouth and

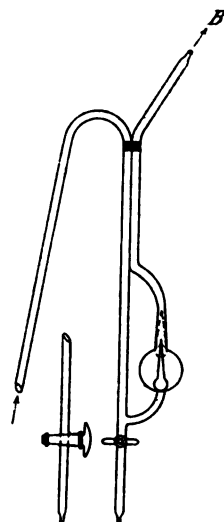
FIG. 27.

FIG. 28.

FIG. 29.



Syphons



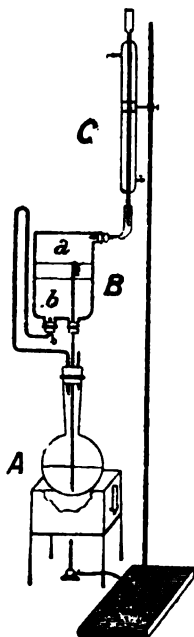
Safety Siphon.

has proven particularly useful in separating two different fluids from each. The construction is plainly shown by Fig. 29, and needs little description. The siphon is filled by suction at B , the glass cock at the long limb being closed. As soon as the ball in the suction attachment is filled, the float within the ball closes the orifice with an audible click. Suction is at once suspended, and on opening the cock the liquid siphons off with a speed which is easily reduced to a minimum by manipulating the cock. This serves also for the separation of the two liquids conveniently if for any reason both liquids should be drawn into the siphon.—Pharm. Ztg., lv (1910), No. 21, 213.

Extraction with Immiscible Solvents—Apparatus Adapted for the Purification of Ether.—Rudolph Fritsch, with such simple appliances as are

usually found in well-appointed laboratories, constructs an apparatus for the extraction of igneous liquids with immiscible solvents, which is shown in the accompanying drawing (Fig. 30). It consists of a flask (*A*) for the reception of the volatile solvent (ether), an inverted, two-necked Woulf's bottle (*B*) for the reception of the liquid to be extracted, and a reflux condenser (*C*), which are connected in a suitable manner by means of glass tubes. The heat of a water-bath being applied to the flask, the ether vapor passes at (*b*) into the Woulf's bottle, permeates the aqueous liquid in a finely divided state and, as it circulates on the top of the liquid, re-

FIG. 30.



Apparatus for Purification of Ether.

turns through (*a*) into the flask loaded with the dissolved matter, to be vaporized as before until the aqueous liquid is considered to be completely extracted.

The apparatus, however, is particularly adapted for the purification of ether (removal of alcohol) by means of calcium chloride solution, now commonly used for this purpose—the alcohol being completely retained by the solution and pure ether accumulating in the flask.—*Pharm. Ztg.*, liv (1909), No. 64, 623; from *Chem. Ztg.*, 1909, No. 83–84.

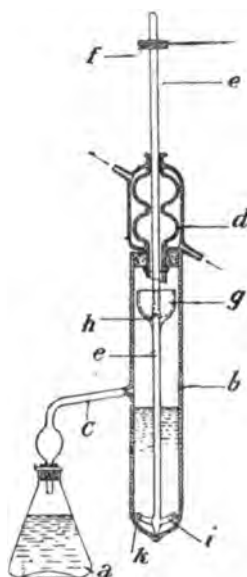
Extraction of Liquids with Immiscible Solvents—Efficient Form of Apparatus.—Lind has devised a new form of apparatus for the extraction of liquids by the so-called “perforation method” with ether, which is illus-

trated by the accompanying cuts (Figs. 31 and 32). The flask (*a*—Fig. 32) contains the ether, or other immiscible volatile solvent, the vapor of which passes through the tube (*c*) into the extraction apparatus (*b*) and thence reaches the condenser (*d*). Here it is condensed and drops into the cup (*g*), from which it flows through the small hole (*h*) into the hollow spindle (*e, e*) of the stirrer and is ejected through openings in the hollow rings (*k* and *i*) at the bottom of the apparatus into the liquid to be extracted. The spindle (*e*) being revolved rapidly on its axis by the pulley (*f*), the solvent is mixed in a finely-divided state with the liquid to be

FIG. 31.



FIG. 32.



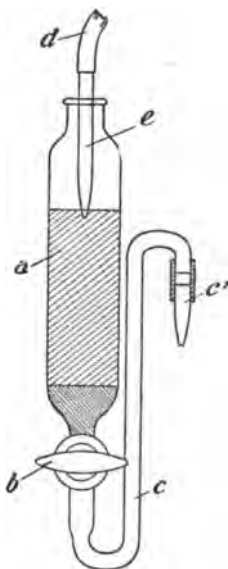
Apparatus for Extraction of Liquids.

extracted, and when sufficiently accumulated flows back into the flask through the tube (*c*), whence it again returns as vapor until the extraction is completed. Obviously, a number of these apparatus can be arranged side by side and several operations conveniently conducted at the same time.—Pharm. Ztg., liv (1909), No. 64, 622.

Extraction with Immiscible Solvents.—Convenient Apparatus.—Hermann Emde describes the simple apparatus shown by Fig. 33 which permits the automatic extraction of specifically heavier liquids with small quantities of specifically lighter immiscible solvents. An ordinary cylindrical separatory funnel is provided with an S tube, (*C* and *C'*), which may be attached by means of rubber-tubing and held in place by means of

wire. The stop cock (*b*) being closed, a quantity of the immiscible solvent is introduced into the funnel and the heavier liquid to be extracted is allowed to drop in slowly in the smallest possible drops—the flow being regulated by means of a screw-clamp at (*d*), observing that the point of the pipette-tube *e* just dips beneath the extracting solvent. When the heavier liquid has accumulated sufficiently to fill the S tube (*c c'*) the stop cock (*b*) is opened and the extracted liquid will then flow out at *c* as fast as it drops into the separatory through *e*. If devisable the liquid from *c* may be dropped into a second extraction apparatus charged with the same solvent, and this with a third, so as to secure complete extraction. But in any case, the apparatus and method secures the extraction of small

FIG. 33.



Extracting with Immiscible Solvents.

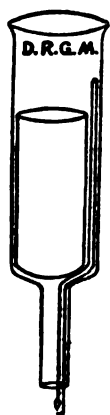
quantities of substances from large quantities of specifically heavier liquids with the smallest possible quantity of the lighter immiscible solvent. Apoth. Ztg. xxiv. (1909), No. 72, 663.

Maceration and Percolation—History and Comparative Value.—Otto Raubenheimer has contributed an exceedingly interesting historical account and criticism on the comparative value of the processes of maceration and percolation for the extraction of drugs which must be consulted in the original to be fully appreciated. In his conclusion Mr. Raubenheimer says that in his experience the percolation process, and especially the improved macero-percolation method of the U. S. P., VIII, although the same cannot be used for the exhaustion of all drugs, decreases the

labor and saves time and is a scientific method par excellence. When properly carried on all the advantages of maceration are obtained, and furthermore it is superior to maceration, inasmuch as no strong menstruum is retained in the marc.—*Amer. Journ. Pharm.*, Jan., 1910, 32-42.

Maceration and Percolation—Historical Review.—At the monthly meeting of the Kings County Pharmaceutical Society, Feb. 8, 1910, Thomas J. Keenan presented a highly interesting contribution to the study of maceration and percolation, in which he traces the history of percolation from

FIG. 34.

Extraction
Apparatus.

the time when, during the early part of the eighteenth century, Edward Lloyd, a coffee-house keeper in Abechurch Lane, London, made his coffee by percolation, to the most recent utterances on the subject of drug extraction, incited by the prophetic words of Professor Tschirch, the eminent Swiss pharmacognocist, that he could foresee a time when medicine having thoroughly ruined its digestion with synthetical remedies, and tested all the organs of the animal body, "it (medicine) would return once more to the most ancient remedies of mankind—to the medicinal plants and drugs, for the utility of which the experience of thousands of years vouches." Mr. Keenan's paper must be read in the original, which appears in *Amer. Drugg.*, Feb. 14, 1910, 73-76.

Extraction Apparatus—Simple Form.—Dr. A. Trager recommends the extraction apparatus shown by Fig. 34 as an efficient substitute for the Soxhlet apparatus, which may be cheaply constructed and requires little explanation. It consists of a glass cylinder, constricted below so as to form a tubular neck and enclosing a thin glass tube, bent to conform to the shape of the cylinder, through which the vapor reaches the reflux condenser (not shown) and returns through the material to be extracted, enclosed in a cartridge in the usual way.—*Pharm. Ztg.*, liv (1909), No. 99, 975.

Dunstan and Short's Extraction Apparatus—Simple Modification.—In order to avoid the lifting up of the column of drug and consequent liability of breaking up and being carried over into the outer tube during extractions with Dunstan and Short's apparatus, P. É. F. Perrédès has devised the expedient shown in the accompanying cut (Fig. 35). This consists essentially of a spiral

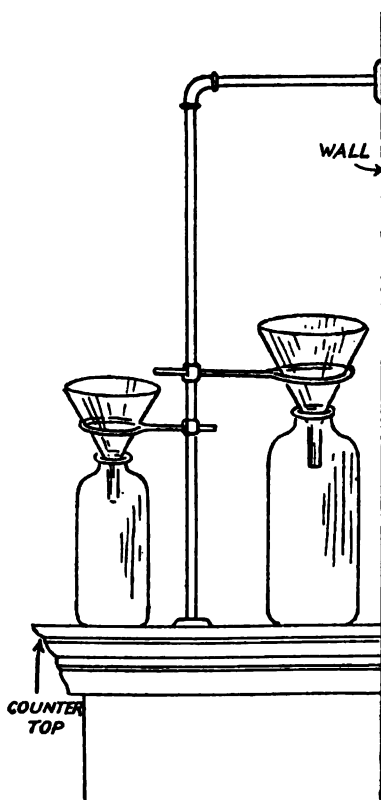
FIG. 35.

Extraction
Apparatus.

spring of brass wire, soldered to a brass-ring above and to another below, but covered with coarse wire gauze, which is inserted into the inner tube so as to press lightly on its contents, and is held in place by a cork inserted in the upper aperture of the outer tube. The details of filling the inner tube, whereby the removal of any small particles from the column of drug is prevented, are visible in the illustration from below upward: A loose plug of glass wool; a layer of clean silver sand about a quarter of an inch thick; the column of drug; a layer of silver sand; a plug of glass wool—the last two similar to those below.—Pharm. Journ. and Pharmacist, Jan. 29, 1910, 106.

Hot Percolation—Advantage for Watery Extractions.—A. Astone com-

FIG. 36.



Percolator Stand.

municates the results of experiments which convincingly point out the advantage of hot percolation over all other methods for the extraction of drugs with water. For this purpose he employs a double-walled or jacketed percolator, in which water may be kept at or near the boiling tem-

perature, and thus permits extraction with boiling water in a simple and expeditious manner.—Pharm. Ztg., lv (1910), No. 11, 107; from Journ. de Pharm. et Chim., 1910, No. 2.

Rigid Percolator Stand—A Practical Idea.—John J. Stephenson constructs the rigid percolator stand shown in the accompanying cut (Fig. 36) from two lengths of gas pipe, 12 and 36 inches in length respectively, each threaded at both ends, one end of each screwed into a socket with four screw holes, the other ends united with an elbow fitting. The socket of the longer limb is screwed to the work-table and that of the short, horizontal limb against the wall or shelf-front. Suitable rings, such as are on an ordinary retort stand, are then provided, of which various styles are obtainable from most dealers in chemical apparatus. The kind having the ring separate from the clamp, and the clamp having two thumb-screws, one for fastening to the upright, the other to hold and permit the extension of the arm to which the ring is attached, are the most suitable.—Bull. Pharm., March, 1910, 121.

The U. S. P. Melting Points—Causes of Divergence and Their Remedy.—In a paper read before the City of Washington Branch of the Association (March 2, 1910), G. A. Menge points out the cause of the divergence in the melting points given in the U. S. and other pharmacopœias, which in essentials he summarizes as follows:

1. The great variety of methods used in melting-point determinations.
2. Varied individual manipulation, including the "personal factor," and especially the rate of heating.
3. Difference in the physical condition of the compounds.
4. The use of thermometers widely differing in their construction or range, or both.
5. The application or omission of emergent-stem correction and the manner of making it.
6. Widely varying interpretations of just what the melting point is (which might be considered to include the apparent use of decomposition point as equivalent to melting point).

The author discusses these different causes of divergence in the sequence given, in order to indicate the remedy to a greater or less degree, and mentions in conclusion of his very interesting paper, that its subject, and the work that has recently been done in the Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service, will be given more complete and detailed treatment in a Bulletin to be published in the near future.—Amer. Journ. Pharm., April, 1910, 178-187.

Thermometer for Determining Melting Points—New Construction.—J. Bredt has devised and patented a thermometer for melting-point determinations which presents certain advantages over those usually employed for this purpose. The device consists of an expansion of the outer

thermometer tube, immediately below the graduation, having four longitudinal depressions or channels, as indicated by the cross-section *a* in the accompanying cut (Fig. 37), which are intended for the reception of the capillary tubes containing the substance to be tested, this arrangement being plainly shown in the cut of the entire apparatus. When the melting-point is to be determined in an air bath (as shown in the cut), these capillary tubes are fastened to the thermometer by means of thin platinum wire; but when a liquid bath, such as conc. sulphuric acid, paraffin, etc., is used, these tubes maintain their position by simple adhesion.—Pharm. Ztg., lv (1910), No. 30, 305.

FIG. 37.



Thermometer.

FIG. 38.



Melting-Point Apparatus.

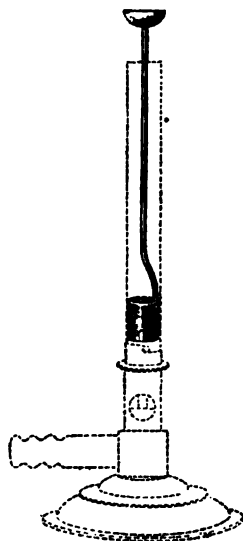
Melting-point Apparatus—Simple Device.—Dr. Th. Weyl has devised the simple apparatus for melting-point determinations shown by Fig. 38. It consists of three different parts: (1) A thermometer with the outer tube

slightly bulged immediately above the mercury bulb; (2) a glass slide, fitting over the thermometer tube and provided with two sets of rings, the one superimposed over the other so that the opening in the upper ring coincides with that in the one beneath, and (3) the melting tubes, which, diminishing slightly in diameter downward, are held securely in position by the two rings, the openings of which are correspondingly different in diameter.—Pharm. Ztg., lv (1910), No. 40, 408; from Chem. Ztg., 1910, No. 55.

Home made Still—Construction from a Wash Boiler.—A. R. Eberle constructs a modified Remington still from an ordinary copper wash-boiler by fitting it with a deep rim into which the lid fits, and attaching an elbow at the center of the lid, of such size that it may be connected with the condenser of a Remington still. A screen on legs nine inches long is provided which fits into the kettle, and serves a good purpose for recovering alcohol from dregs. These are placed on a moistened cloth covering the screen, and heat being applied the steam from water under the screen carries over the alcohol. Among other operations for which this still has proven useful, it serves excellently for preparing distilled water, ten gallons being obtainable during a working day with one charge of the apparatus. When so used, the space in the lid above the rim is filled with a lot of plaster of Paris and linseed meal.—Proc. Wisc. Pharm. Assoc., 1909, 66-67.

Spectral-Attachment for Bunsen Burners.—A Simple Device.—Prof. H. Precht has originated and employs the simple device shown by Fig. 39, which when inserted into the tube of a Bunsen burner facilitates the ordinary flame tests and is particularly advantageous in spectral operations requiring the prolonged production of colored flames. It is constructed of a short section of brass tubing, split so as to give it the effect of a spring, to which a segment of iron wire bearing a small iron cup is soldered. The upper part of this wire and the little cup may, if desirable, be also constructed of platinum. The brass tube, acting as a spring, retains its position within the burner tube at any height, and this permits the adjustment of the cup containing the substance to be examined in any part of the flame that is desirable. The wire is so bent that the position of the cup is always coincident with the axis of the flame. Pharm. Ztg. lv (1910), No. 13, 128.

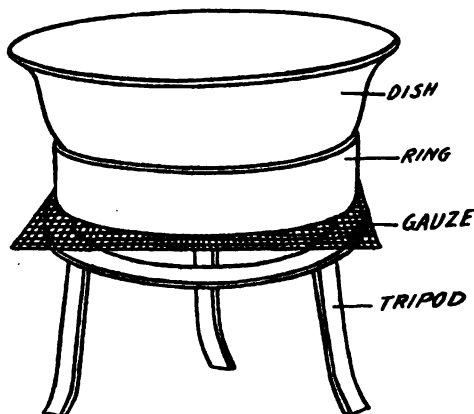
FIG. 39.



Spectral Attachment for Bunsen Burners.

"Steady" for Evaporating Dishes—A Good Suggestion.—Having among a number of new porcelain evaporating dishes one that proved exceptionally "wobbly," Emil Reger had a tinner make a ring of galvanized iron of suitable dimensions—in this case $1\frac{1}{2}$ in. high and 6 in. diameter—

FIG. 40.



Evaporating Dish.

which proved an excellent support for steadying the dish during evaporations over the open flame or other operations for which the dish may be used. The accompanying cut (Fig. 40) is self-explanatory.—*Bull. Pharm.*, Jan., 1910, 28.

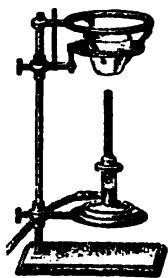
Oil-Bath—Useful Composition.—Louis W. Bosart, Jr., finds a mixture of 10 parts of refined cotton-seed oil and 1 part of beeswax to make a very satisfactory oil-bath. It emits very little fume below 250°C ., and can be used safely almost throughout the range of the ordinary mercury thermometer, having a flash-point above 300°C . when heated in an open cup. A sample of hard paraffin under the same conditions flashed at 215°C . The mixture has the advantage of the paraffin-bath that it solidifies on cooling, so that there is not the liability of the oil spilling out when not in use, and it has the added advantage that it melts quickly.—*Chem. News*, Nov. 12, 1909, 238; from *Journ. Amer. Chem. Soc.*, 31, No. 6.

Crucible Support—A Practical Device.—Carl Bormann describes the crucible support shown by Fig. 41, which offers some practical advantages. It consists of two small rings of different size, the larger superimposed above the smaller and having three movable porcelain holders attached which rest loosely upon the lower and smaller ring. By raising or lowering the smaller ring the points of the porcelain supports spread out or close upon each other, and in this way accommodate larger or smaller crucibles, which are held securely by the three points suspended from the upper

ring.—Apoth. Ztg., xxiv (1909), No. 65, 587; from Ztschr. Analyt. Chem., 48 (1909), 462.

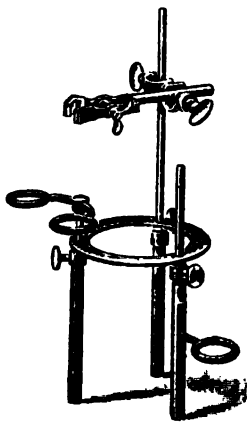
Universal Tripod—A Convenient Device.—Fleissner has devised a new form of tripod, the construction of which permits its use in various ways.

FIG. 41.



Crucible Support.

FIG. 42.



Universal Tripod.

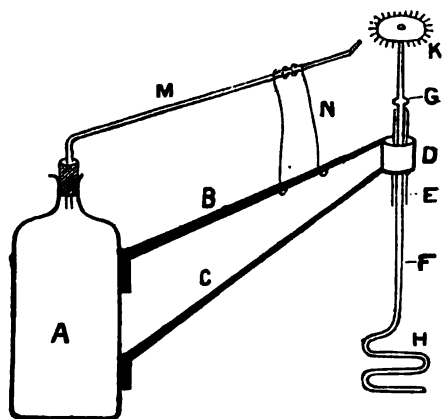
It consists of the usual ring, but the legs are hollow and are provided with thumb-screws. As shown in the drawing (Fig. 42) this arrangement permits of the insertion of rods bearing clamps for holding burettes, flasks, etc., and the rods may be fixed at any suitable height and thus used for holding rather complicated apparatus.—Apoth. Ztg., xxiv (1909), No. 67, 602.

Mechanical Stirrer.—Novel Construction.—Douglas H. B. Couman has devised a mechanical stirring apparatus which is rapidly rotated by a jet of steam generated in a copper boiler of 1 liter capacity and is efficient in a solution containing 50 per cent. of sugar. The apparatus, as shown by Fig. 43, consists of a cylindrical copper flask (*A*) to which two brass tubes (*B* and *C*), 20 cm. long are soldered, and these support a piece of wide brass tubing (*D*) which is fitted with a cork through which a glass collar (*E*) is vertically fixed. The stirring rod (*F*), enlarged to a smooth disc (*G*) is slipped through the glass collar and then bent as shown at *H*. On the apex of the stirring rod a circular cork (*K*, 5 cm. in diameter and 1 cm. thick, is fitted, and this carries a number of vanes of zinc plate $\frac{1}{2}$ Mm. thick and projecting from the cork about 1 sq. cm.—these vanes being inserted into slits made with a razor, and placed about 1 Cm. apart around the circumference, at an angle of 50° with the vertical, so that the steam from the glass pipe (*M*) will exert a lifting as well as rotating force, the diminishing friction at *G*. The string (*N*) holds the glass jet in a slightly

strained position and diminishes vibration. Pharm. Jour. and Pharmacist, Nov. 27, 1909, 670.

Porcelain Mortars—Special Advantage.—P. I. Minton observes that in titrating salol, veronal, or duotal in a glass or Wedgwood mortar, the

FIG. 43.

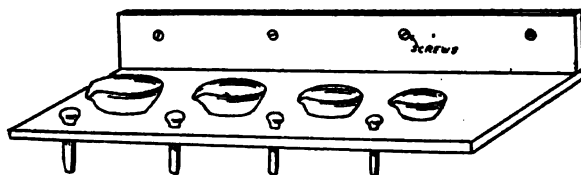


Mechanical Stirrer.

mortar becomes electrified and the fine powder adheres to the sides, making it almost impossible to get it all out with a spatula. He finds that porcelain mortars do not become electrified under these conditions, and therefore always uses them when such substances require trituration. If porcelain mortars are not available the addition of one or two drops of alcohol to the powder will prevent it from adhering to the sides.—Bull. Pharm., Nov., 1909, 472.

Mortar Rack—Convenient Device.—Finding it hard to pick out the

FIG. 44.



Mortar Rack.

right mortar when they are either on a shelf or in the drawer, Lawrence Prudhome constructed the rack for their reception shown by Fig. 44, which supports the mortars well and has proven a great convenience. The required number of holes are cut into a soft piece of pine board to accom-

modate the different mortars, observing that these holes are a little larger than the bottom of the mortar. Small holes are also bored for the reception of the pestle belonging to the mortar, but care must be taken that the holes for mortars or pestles are not too big.—*Bull. Pharm.*, Feb., 1910, 75.

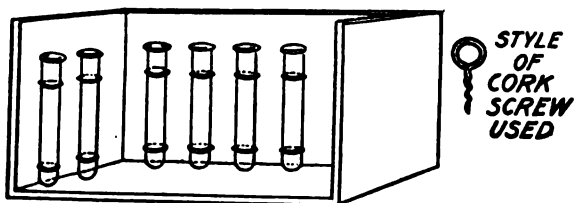
Universal Laboratory Rack—Useful Construction.—Dr. Kehler has devised and patented (in Germany) the laboratory rack shown by Fig. 45, which is constructed of tinned wire, and commends itself, by its compactness, accommodating in a small space 80 test-tubes, besides a number of

FIG. 45.



Laboratory Rack.

FIG. 46.



Test-Tube Rack.

Erlenmeyer and other flasks, together with pipettes, thermometers, funnels, etc., ordinarily required in the experimental laboratory. It has the further advantage of being easily cleaned, and rests firmly on the table.—*Pharm. Ztg.*, lv (1910), No. 30, 305.

Test-Tube Rack—Convenient Construction.—M. Sollenberger constructs a cheap, convenient and stable test-tube rack by removing the top and one of the sides of a wooden box, say about 10 x 6 inches square and 7 inches high, the sides about $\frac{3}{4}$ inch thick, and screwing on the inner sides,

as shown in the drawing (Fig. 46), a row of corkscrews (of the style shown) about an inch from the bottom and another row four inches above, taking care so that the rings of the two rows be coincident. The size of the rings and rack depends on that of the test-tubes in use.—*Bull. Pharm.*, Jan., 1910, 28.

Pharmaceutical Glass Ware—Alkalinity.—Dr. C. Jacobsen records a series of examinations of prescription bottles which have demonstrated the presence of alkali in a soluble condition sufficient to give decided reaction when water after contact with the glass was titrated with $\frac{N}{1000}$ HCl using phenolphthalein as indicator. As an example, a number of vials of different capacities were each rinsed, drained, and set aside 24 hours; then portions of 10 Cc. of water were shaken in each vial and titrated with phenolphthalein as indicator. In almost every instance alkalinity of the water was demonstrated. On subjecting the same vials, containing 10 Cc. of pure water, to sterilization during one hour in a current of steam,

FIG. 47.



FIG. 48.

**Beaker Flasks.**

the water in every case showed strong alkalinity, the quantity of $\frac{N}{1000}$ HCl required for saturation varying according to the size of the vial as well as the quality of the glass. Direct experiments also demonstrated that morphine was precipitated from neutral solutions of the hydrochloride when sterilized and kept during 24 hours in some of these glasses.—*Apoth. Ztg.*, xxv (1910), No. 30, 262.

Beaker Flasks—A New, Graduated Form.—Prof. A. Junghahn has devised a new distilling flask combining the advantages of the ordinary form of the beaker with that of the flask and measuring glass. The new flask is shown in two shapes by Figs. 47 and 48, the one with a flat bottom, the other rounded. The graduation enables the addition of definite volumes of different liquids in operations requiring their admixture, or to distil off

a definite volume of the contents without the necessity of using the usual accessories, while, on the other hand, they adapt themselves to all the individual purposes for which the beaker, flask or graduated measure are commonly employed. The flasks are, however, also employed without graduation.—*Pharm. Ztg.*, lv (1910), No. 13, 127.

Three-necked Flask—A Form Suitable for Organic Work.—Emil Maas describes a new form of flask, which is particularly adapted for organic experimental work. As shown by Fig. 49, it is provided with three tubulures, the central one being large enough to permit the introduction of a mechanical stirrer, one of the side tubulures being intended for a dropping funnel, the other for a thermometer. The flask adapts itself for reduction

FIG. 49.

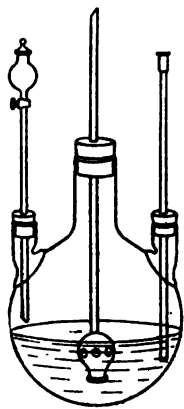
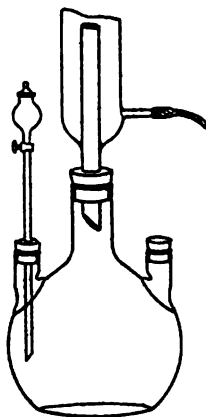


FIG. 50.



Three-necked Flasks.

operations in organic work, the central tubulure here serving the purpose of being a cooler, while the third tubulure permits the introduction of metallic sodium (Fig. 50).—*Pharm. Ztg.*, liv (1909), No. 91, 900.

The Ampul and Its Uses in the Preservation of Sterile Solutions is the title of an illustrated paper by Caswell A. Mayo, showing and explaining the ampuls of various shapes and sizes, the methods of filling, and the apparatus necessary for the purpose. The voluminous paper appears in the "Proceedings," 1909, 1106-1122.

Ampul Filler.—Efficient Form.—Dr. Wulff has constructed a new apparatus for filling ampuls which is shown by Fig. 51. It consists of a graduated measuring tube, having two scales, the one intended for measuring the quantity to be introduced into the ampul, the other to accurately adjust the quantity. It is surmounted by a reservoir from which the fluid is supplied by a turn of the glass cork, the inflow being regulated by a small

tongue-shaped tube, securing equability of flow and preventing frothing of the liquid. A small hole in the upper part of the tube, loosely stoppered with cotton, establishes communication with the outer air. The filling is done by means of a hypodermic needle attached to the lower orifice of the graduated tube by means of a rubber tube closed with a clip in the usual manner. Obviously, the apparatus may be utilized for a variety of purposes requiring accurate measurements of fluids. Pharm. Ztg., lv (1910), No. 21, 212.

FIG. 51.



Ampul Filler.

FIG. 52.



Capped Bottle.

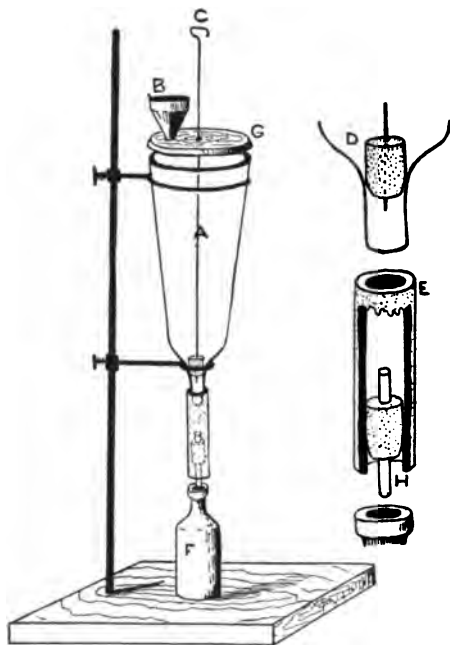
Capped Bottle.—Improved Construction.—Wetzel has devised the new form of capped bottle shown by Fig. 52 which is provided with a cup-shaped ground-glass stopper for the reception of a suitable material to absorb the moisture in the air enclosed within the glass cap carefully ground to fit the shoulder of the bottle. The device thus efficiently excludes moisture from the material preserved in the body of the bottle. Pharm. Ztg., liv (1909), No. 99, 975.

Eyedrop Bottle and Dropper.—Efficient Form.—Dr. Emanuel has devised the eyedrop bottle with dropper shown by Fig. 53, in which the eyedrops may be sterilized and maintained sterile until completely used. It consists of the bottle *a*, the dropper *b*, protected by the ground-glass cap

c, and the truncated funnel-tube *d*, closed with a rubber membrane. The bottle, the glass cap, and the rubber membrane are first boiled separately; the liquid is then poured into the bottle through the funnel-tube, subjected to brief boiling over the flame, and the funnel is then closed with the rubber membrane; while the dropper is protected by fitting on the glass cap. Simple pressure on the rubber membrane regulates the flow of drops, and the contents of the bottle are perfectly protected in a sterile condition until the last drop is used.—Pharm. Ztg., lv (1910), No. 21, 212.

Bottle Filler—A Home-Made Device.—C. A. Charles has used with convenience and satisfaction the home-made bottle filler shown by Fig.

FIG. 54.



Bottle Filler.

FIG. 53.



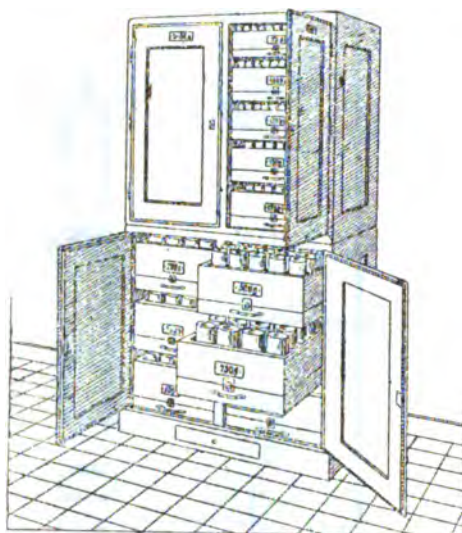
Eyedrop Bottle and Dropper.

54, which can be constructed at a trifling expense with such apparatus and material as is usually on hand. The reservoir for the liquid to be filled consists of a glass percolator (*A*), provided with a cover (*G*) bearing a funnel (*B*) to convey fresh supply of liquid into the percolator. A piece of telegraph wire (*C*) passes through the centre of the cover and ends in a rubber stopper (*D*), closing the orifice in the neck of the percolator, over the outer extremity of which a short section of rubber tube (*E*) is stretched, into the extremity of which, in turn, a perforated cork (*H*) bearing a short section of glass tubing is inserted, as shown at (*H*) in the

drawing—the calibre of this glass tubing being such as to conveniently fit into the neck of small bottles, as shown at (*F*). The application of the device is obvious, the flow of liquid from the percolator resulting on raising the stopper (*D*) by means of the wire (*C*), and effectually ceasing on again pressing the stopper into place.—*Drugg. Circ.*, Nov., 1909, 587.

Bottle Draining and Drying Closet—A Convenient Receptacle for Prescription Ware.—Herman Herwald has patented (in Germany) the convenient draining and drying closet for prescription bottles shown by Fig. 55, which requires little explanation, These closets are constructed of different sizes, according to requirement, the one here shown having 18 compartments or drawers accommodating 1600 bottles of all sizes, from

FIG. 55.



Draining and Drying Closet.

FIG. 56.



Collapsible Tube.

5.0 to 1000.0 capacity. The drawers have the same superficial size, but differ in height; they are lined with zinc, the bottom being slightly inclined toward the rear so that the rinsing water may escape through an appropriate orifice and collect in a common receptacle at the bottom of the closet, from which it is automatically carried into a common drain. The rear wall of the closet, similar to the drawers themselves, is also zinc-lined.—*Apoth. Ztg.*, xxiv (1909), No. 91, 859.

Collapsible Tubes—Label Attachment.—George Wenderoth has introduced collapsible tubes with a tag attachment for labeling contents, which, as shown by Fig. 56, recommends itself as a practical device in dispensing prescriptions for ointments, pastes, etc.—*Pharm. Ztg.*, liv (1909), No. 91, 900.

Drug Jars—Improved Form.—W. Haldenwanger has patented an improved form of drug jar which, apart from its pleasing shape, possesses certain practical advantages over the shop jars ordinarily in use. As shown by Fig. 57, the bottom of the jar is rounded on the inner surface, so as to avoid the sharp angles of the usual form, thus facilitating the complete removal of the contents and the subsequent cleaning, while the mouth of the jar flares outwardly, permitting the introduction of the hand or finger for the same purpose.—Pharm. Ztg., liv (1909), No. 82, 811.

FIG. 57.



Drug Jars.

Porcelain Drug-Jars — Important Improvement.—Doering calls attention to the improved white porcelain drug-jars and containers which have recently been introduced by the Berlin firm of Bach & Riedel. These jars, while white on the outside and in no way distinguished in appearance from the ordinary shelf ware, are glazed on the inner surface *impenetrably black*, thus excluding light completely from the substances contained in them.—Pharm. Ztg., liv (1909), No. 85, 839.

White Enameled Ware—Utility in Laboratory Operations.—E. Fullerton Cook calls attention to a line of white enameled ware, sold in the house-goods departments of many stores, which may be applied with great advantage to many drug-store laboratory operations. He has used them for water-baths for several years. The plates admirably adapt themselves to covers for funnels and percolators. The bowls, of many sizes, are inexpensive and strong and clean, and may be used in innumerable ways and for almost every purpose for which a porcelain dish is required.—Amer. Journ. Pharm., Sept., 1909, 417.

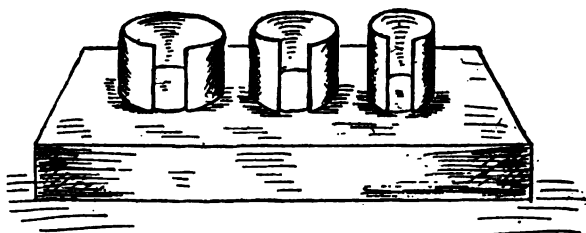
Aluminum Utensils—Precaution against Contact with Mercurials.—"J. Sch." observes that while it is generally well understood that alkalies, soap, acids, etc., act unfavorably on aluminum, it is not so well known that certain dry salts, particularly those of mercury, are injurious to aluminum utensils, converting the metal into oxide. Mere traces of corrosive sublimate, for example, in contact with an aluminum surface produce spots consisting of alumina, the mercury being reduced and further injuring the aluminum by forming an amalgam. While aluminum is of itself combustible in air, to form aluminum oxide a superficial thin layer of oxide is almost instantaneously formed on the surface, and this protects it from further oxidation.—Pharm. Ztg., lv (1910), No. 34, 346.

Zinc Containers—Corrosion by Alum.—Dr. O. Langkopf having opportunity to subject an incrustation which had formed in a zinc canister used for storing alum, found that this incrustation was caused by the decomposition of the alum incited by high temperature and involving the container itself. The explanation is as follows: Primarily the zinc was oxidized by

the high (climatic) temperature prevailing and by the moisture supplied by the vaporization of the water of crystallization of the alum. In turn the zinc oxide precipitated alumina from the aluminum sulphate and was converted into zinc sulphate, water being again liberated, thus facilitating the further oxidation of the zinc.—Pharm. Zentralh., 51 (1910), No. 17, 333.

Round Labels—An Extemporized Receptacle.—L. W. Marshall gives the following directions for constructing the convenient receptacles for round labels shown by Fig. 58: "Procure a block of wood and have a carpenter saw holes the size of the paper used. Save the round blocks. Take pieces of heavy cardboard (or pieces of mailing tubes and cut slits up their sides about an inch wide) and insert them in the openings and place the round blocks back. The latter will hold the tubes in place. Labels

FIG. 58.



Round Labels.

may then be stacked in the tubes where they will always be in place."—Drugg. Circ., Aug., 1909, 399.

Label Requirements in State Pure Food and Drug Laws is the subject of a paper by E. G. Eberle which appears in the "Proceedings" of 1909 (p. 693-695), in which attention is directed to some of the difficulties encountered in compliance with the requirements, some of which are of questionable necessity or utility.

A Convenient Paste-Pot is according to E. Fullerton Cook's suggestion constructed as follows: A quart, pure aluminum kettle, having an aluminum lid slipping on but fitting lightly, both drawn from a piece of sheet aluminum and very strong, is purchased. The handle is removed and a round hole, one and one-half inches in diameter, punched in the center of the lid, after which the top is depressed towards the center by using considerable pressure. Then selecting a good brush of suitable size—the best of these being bound in a metal which is not liable to rust—the metal winding is first shellacked, then wrapped closely with twine from the bristle to the wood, and this winding in turn is heavily shellacked with two or more coats. A disk of rubber, about one-fourth inch thick and 2 inches diameter is now cut from a rubber stopper, a hole punched in the center,

and the brush handle is fitted into this. When the brush is standing in the pot, the rubber disk effectually excludes air and prevents the paste from drying, and when the brush is to be used the excess of paste may be wiped off as it is withdrawn. *Amer. Journ. Pharm.*, Sept., 1909, 415-416.

Pill Finisher—A Self-Adjusting Device.—Walter Ruch describes a self-adjusting pill-rounder and finisher which he has found quite convenient and satisfactory. It consists of a flat circular box open at the bottom, a thin disk fitting the interior of the box, which is movable vertically by means of a piston extending through the top of the box, the top of the piston having a knob attached for placing the finger. When using simply place the pills beneath the box. This raises the disk according to the size of the pills and by means of the finger on the knob of the piston any decided pressure may be exerted upon the pills beneath, which may now be rolled and finished perfectly.—*Proc. N. J. Pharm. Assoc.*, 1909, 45.

GENERAL SUBJECTS.

The Profession of the Practicing Pharmacist is the title of an interesting paper by C. S. N. Hallberg which appears in the "Proceedings" of 1909 (pp. 686-693). The author discusses his subject chiefly from the historical and ethical standpoint, and concludes with the relation of the medical code of ethics to pharmacists, leading to the "Declaration on the Prescription" adopted tentatively by a number of branches of the A. Ph. A., and covering the following propositions: 1. The attitude to the prescription. 2. The prescribing by druggists. 3. The dispensing by doctors.

Should the Dispensing of Medical Prescriptions be Exclusively Confined to Pharmacists? is the title of a paper read by the president of the British Pharmaceutical Conference at the Newcastle-on-Tyne meeting in 1909, which was animatedly discussed by both pharmacists and physicians present, the consensus of the opinions expressed being distinctly in support of the decided opinion held by President Tocher that the dispensing of medical prescriptions should be confined to pharmacists. It was proposed that a joint standing committee of members of the British Medical Association and of the British Pharmaceutical Conference should be created, whose preliminary duties would include: (1) dispensing problems; (2) prescribing problems; and (3) drug problems. Beginning with the collection of data and information, the annual reports as time goes on would give an idea as to the steps necessary to bring about a more satisfactory relation in this respect between physicians, pharmacists and the public, for it has been a practice from time immemorial for doctors to supply their own physic; and if any practical measure can be devised whereby they could be relieved of this encumbrance to their work, medical men will surely hail the measure with joy, and the change will redound to the benefit of all parties concerned—the doctor, the pharmacist, and the pub-

lic. This admirable paper and the discussion following are well worth more than casual perusal by pharmacists in our own country, who, on different grounds, are confronted with a similar problem.—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1909, 279–292.

Revision of the U. S. P.—Suggested Standards and Changes.—Charles H. LaWall publishes notes collected during a period of several years, embodying observations made from a practical application of the various tests and requirements of the U. S. P. in examining a large number of substances. While some of them are not entirely new, a number of them, as far as known to the author, have not appeared in pharmaceutical literature, and are submitted as being in the lines of constructive criticism. This interesting paper may be consulted in Amer. Jour. Pharm., Jan., 1910, 21–26.

The National Formulary; a Criticism! is the title of a voluminous paper in which H. G. Posey criticizes a very large number of the formulas at present in the N. F. This paper is printed in the "Proceedings," 1909, 980–998.

Modifications of U. S. P. and N. F. Formulas are suggested by John A. Dunn in a paper which is published in the "Proceedings," 1909, 942–959. Similarly,

Some Suggestions for Improvements in the National Formulary are made by a committee of the Philadelphia Branch of the A. Ph. A., which appear in the "Proceedings," 1909, 959–963, and by Mr. Bruder, chairman of a Special Committee of the Chicago Branch, on pp. 963–967; while

Laboratory Notes on Some N. F. and Other Preparations are contributed by J. D. Aug. Harz, on pp. 967–971; and

Suggestions for the Modification of Certain N. F. Preparations are made by A. Alton Wheeler, on pp. 971–973 of the same "Proceedings."

Broadening the Usefulness of the National Formulary is the title of a paper by Frederick E. Niece, which appears in the "Proceedings," 1909, 976–979.

Manufacturing Notes on Some Official Preparations are contributed by F. W. Nitardy in which he suggests improved formulas for syrup of senega, comp. solution of sodium phosphate, and several elixirs. The paper appears in the "Proceedings," 1909, 1055–1058.

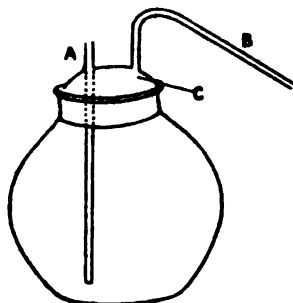
Galenical Preparations.—Refractometric Examination.—W. B. Cowie and J. O. Broadbent record the results of some preliminary experiments undertaken with the object of ascertaining the possible utility of a refractometric method of examination of galenical preparations for determining the character of the extraction and the absence of extraneous matter. They have applied a method, which is explained in some detail, to fluid-

extracts of cascara sagrada of their own make and from commercial sources, and find the refractive indices to agree well with the specific gravity and amount of extraction. Trans. Brit. Pharm. Conf. (Year-book of Pharmacy) 1909, 323-324.

Alcoholic Galenicals—Reduction of Alcohol and Substitution of other Solvents.—D. B. Dott observes that while the B. P. of 1885 directs proof spirit as the weakest menstruum for preparing tinctures, that of 1898 directs in some cases a menstruum as low as 45 per cent. alcohol, and he raises the question whether this reduction in alcoholic strength cannot be still further extended in the preparation of tinctures and similar galenicals. He mentions quite a number in which he thinks this can be done with advantage and without reducing the medicinal value of the preparation. Some of them might be reduced from 90 to 70 per cent. (orange, lavender compound, lemon, podophyllum); others from 70 to 60 per cent. (cascarella, cinchona, cinnamon, conium, pyrethrum); or from 60 to 45 per cent. (calumba, chiretta, saffron, digitalis, ergot, rhatany, hops, quillaya, squills and senega; while tinctures of aloes, cochineal, hyoscyamus, opium, quassia and stramonium might be reduced from 45 to 30 per cent. The author also mentions the advantages of using in some cases glycerin or acetic acid, wholly or in part, as menstrua for galenicals in which alcohol, more or less diluted with water, is now used.—Trans. Brit. Pharm. Conf. (Year-book of Pharmacy), 1909, 331-333.

Spirituous Galenicals.—Estimation of Extractive and Glycerin.—W. A. H. Naylor and F. J. Chappell have experimented to determine a method suit-

FIG. 59.



Estimation Flask.

able for the estimation of extractive and glycerin in spirituuous galenical preparations, and as a result of their investigations propose a method which they describe as follows: The flask used for the distillation is a modification of Glasgen's flask for determining water in cement, which is shown by Fig. 59. The stopper is hollow, and has two tubes fused into it. Tube A, which reaches to the bottom of the flask, is cut off not far above the neck.

Tube *B* is bent, and cut off level with the inside of the stopper *C*. The flask is immersed up to the neck in a bath of a suitable liquid—glycerin itself answers well. In the bath is a coil of compo tubing connected to *A* by pressure tubing with a screw clip. This connection should be made so as to leave as little of the tubing outside the bath as possible. Tube *B* is connected by glass tubing, joined by short lengths of pressure tubing, to two Woulff's bottles containing water to a depth of about $\frac{1}{2}$ —1 inch above the ends of the delivery tubes. These in turn are connected with a water pump and a manometer. To conduct an estimation introduce 5 Cc. or other suitable quantity of the galenical into the flask, previously weighed. Place the flask in the bath and connect it to the Woulff's bottle and the coil, the screw clip being closed. Exhaust the apparatus till the pressure is about 18–20 Cm., and then by carefully opening the clip allow a slow current of washed air to pass through the flask—meanwhile raising the temperature of the bath to 130°–140° C. When all the spirit and water have passed over known by the tube *B* becoming cool—connect the compo coil with a steam generator, and admit steam very gently at first, to avoid splashing, and then gradually increase the current to a fairly rapid one, which should be continued for three hours, the pressure being maintained at 18–20 Cm. At the end of this period carefully admit washed air till the pressure reaches the normal again. Disconnect the apparatus and wash the stopper and tube *B* with distilled water, adding the washings to the distillate. Any extraction remaining in the lower end of tube *A* should be washed into the flask by a suitable solvent, and the flask and its contents dried in an air oven at 110° C. and weighed. This gives the extractive. Concentrate the washings to about 5–10 Cc., filter, wash the basin and filter paper, and make the filtrate up to a definite volume. Determine the glycerin in this filtrate, or in an aliquot part of it, by *Hehner's bichromate method* as modified by *Richardson and Jaffé* (*Journ. Soc. Chem. Ind.* 1898, 330), omitting the treatment with lead subacetate, etc. The results by this method, as applied to a large number of preparations in which the glycerin and extractive contents were known, are given in a table, and prove the accuracy and reliability of the method if carried out with reasonable care. *Trans. Brit. Pharm. Conf. (Year-book of Pharmacy)* 1909, 260–265.

B. PREPARATIONS.

AQUÆ.

Ammonia Water—Presence and Detection of Pyridine.—*Herman Kunz-Krause*, discussing the G. P. test for the absence of certain cyclic amino compounds which, like pyrrol and the bases of the aniline and pyridine series, produce a more or less red-colored instead of a colorless nitrate when ammonia water is evaporated to dryness with nitric acid in excess,

observes that pyridin is practically the only base that requires consideration, but that its presence in ammonia water is more frequent than is generally supposed. A less circumstantial test than that of the G. P. is therefore a desideratum, and such he finds in the following, which is based on the pronounced and characteristic disagreeable odor of the pyridine and depends on the fact that ammonia is a stronger base than pyridine, and remains in a free state along with the excess of ammonia when the ammonia water is treated with insufficient acid to complete neutrality. The proposed test is carried out by placing 5 Cc. of the ammonia water into a capacious test-tube, the mouth of which can be conveniently closed with the thumb, and adding, in small portions at a time, but as rapidly as possible, 2 Gm. of finely-powdered tartaric or citric acid, incorporating the powder if it forms lumpy aggregations by means of a glass rod. Before and at the end of last addition of the acid, the mixture is vigorously shaken and tested by the smell. On the disappearance of the ammonia odor by the heat of reaction, that of pyridine, owing to its high vapor tension, is retained and manifests itself unmistakably by its penetrant and nauseous quality.—Apoth. Ztg., xxv (1910), No. 11, 87.

Bitter Almond Water—Decomposition.—Dr. F. M. Litterscheid, having noticed that perfectly clear solutions of the hydrochlorides of morphine, codeine and dionine, in bitter almond water of apparent official quality, soon became turbid and gradually formed a deposit, traced this unusual reaction to the presence of ammonia. Further investigation leads him to regard the amorphous precipitates to be impure condensation products of ammonia and benzaldehyde, the ammonia resulting from the decomposition of the bitter almond water, the hydrogen cyanide in aqueous solution being under certain conditions readily converted into ammonium formate. This impurity may be removed by treatment of the bitter almond water with a little blood-charcoal and filtration after standing about one hour.—Apoth. Ztg., xxv (1910), No. 13, 106.

Cherry-Laurel Water, Ph. H. IV—Reliability of the Formula.—Supplementing his previous studies concerning the conditions demanded to produce a reliable cherry-laurel water (see Proceedings 1909, 65), Dr. K. Siegfried has made a comprehensive study of the subject, with particular reference to the demands of the Swiss Pharmacopœia, IV, which has been the subject of numerous criticisms (by Fleissig, Berger, Weitbrecht, Guerin, Gouet and others). Referring for the details of this study to the original, the author's results are briefly summarized as follows:

1. The formula of Ph. H. IV, is correct and reliable.
2. The demands of this standard can be complied with.
3. It is desirable, however,—
 - a. That leaves gathered after the flowering period may also be used.
 - b. That the specific gravity 0.9940 to 0.9960 be adopted.

c. That, in place of "neutral reaction," faint acid to neutral reaction be permitted.

d. That, as proposed by Dr. Weitbrecht, cherry-laurel water is to be carefully preserved, protected from light, in completely filled bottles, of at most 250 Cc. capacity, and well stoppered.

e. That the determination of quality (and identity) be made with the aid of sodium bisulphite.—Schw. Wschr. f. Ch. u. Pharm., xlvii (1909), No. 36, 542-549.

Distilled Cinnamon Water—Manipulation.—A writer in the "Südd. Apoth.-Zeitung" (1909, No. 60) observes that the German pharmacopœial description of the characteristics of cinnamon water, "turbid when first distilled, afterwards becoming clear," should be supplemented by the further characteristic of having an agreeable sweet, followed by a sharp burning taste. But to obtain such a cinnamon water, the coarsely powdered cinnamon should not be macerated for 12 hours with the necessary quantity of alcohol by itself (as is the case when the so-called 1 : 100 cinnamon water is made? Rep.), but it is absolutely necessary to macerate with a mixture of alcohol and water, the latter in large preponderance (1 : 8). This effects the opening out of the cellular tissues so that the volatile constituents of the bark pass completely into the distillate, which possesses all the characteristic requirements above indicated and an aroma with which the water obtained by dilution of the concentrated (so-called 1 : 100) cinnamon water, or that obtained from the volatile oil itself, will not bear comparison.—Pharm. Ztg., liv (1909), No. 62, 601.

CAPSULÆ.

Soft Capsules—Importance of Fresh Preparation.—In the course of some observations on the facility and advantages of dispensing freshly-filled soft capsules, Louis Emanuel, Jr., mentions some experiments made to determine the effect of age on the capsules. While a fresh, home-filled capsule was completely dissolved in an acidulated pepsin solution within eight minutes, another of the same lot, taken from the stock a month later, required fourteen minutes; another, three months old, twenty minutes, and when a year old one of the same capsules required three hours and ten minutes for complete solution.—Amer. Drugg, April 11, 1910, 193.

ELIXIRIA.

The National Formulary Elixirs are the subject of a paper contributed by William Mittelbach, which appears in the "Proceedings," 1909, 973-974.

The Perpetuation of Elixirs in the National Formulary is discussed in a paper by M. I. Wilbert, who regards their perpetuation as evidence that we have not kept in touch with the advances made in pharmacology and

drug therapy. This paper appears in the "Proceedings," 1909, 1044-1047.

New Basic Elixirs—Formulas Recommended for Inclusion in the N. F.
—George M. Beringer contributes a number of formulas for basic elixirs to be included in the National Formulary for the purpose of replacing some of the basic elixirs now directed in certain preparations, whereby they may become more satisfactory both in regard to flavor and in alcoholic content, a reduction of the latter being particularly desired in the formulas for some of the sedative elixirs, such as ammonium valerate, chloral hydrate and the bromides. Referring to the original paper for the formulas for these new basic elixirs, these are here mentioned by their titles, as follows:

Elixir Amygdalæ Compositum—Compound Elixir of Almond.

Elixir Cardamomi Compositum—Compound Elixir of Cardamom.

Elixir Curassao—Elixir of Curacao.

Elixir Vanillini Compositum—Compound Elixir of Vanillin.

Formulas are also given for "Compound Spirit of Cardamom" and for "Compound Spirit of Vanillin," which are needed in the formulas for these basic elixirs.—Proc. Penna. Pharm. Assoc., 1909, 251-255.

Vehicula—A New Class of N. F. Preparations.—In a paper read before the Pittsburg Branch of the A. Ph. A., Louis Emanuel says there is need for a class of fluid preparations to be used as vehicles, or solvents, differing in character from any preparations at present available for the purpose indicated. That this is true is evidenced by the great popularity of a number of proprietary preparations which have made their appearance and been eagerly taken up by the medical fraternity during the past decade. Mr. Emanuel therefore urges the "Branch" to use its best efforts toward bringing about the adoption by the National Formulary Committee for inclusion in that volume of formulas the following new class of preparations which may be used as solvents, diluents or vehicles:

Vehiculum Rubrum. (Red Vehicle.)

Asarum, No. 60 powder	15.00 Gm.
Cudbear, No. 60 powder.....	1.00 Gm.
Alcohol	25.00 Cc.
Glycerin	50.00 Cc.
Water	175.00 Cc.

Exhaust the mixed drugs with the menstruum by percolation.

Vehiculum Album. (White Vehicle.)

Compound spirit of orange, U. S. P.....	3.00 Cc.
Glycerin	50.00 Cc.
Water	197.00 Cc.

Mix the spirit and glycerin and add the water.

Vehiculum Ananasii. (Pineapple Vehicle.)

Alcohol	15.00 Cc.
Glycerin	25.00 Cc.
Pineapple juice	60.00 Cc.

The fruit of *Ananassa sativa* is pared and sliced, ground in a **gem** chopper, and the juice expressed through muslin. The juice is **then** mixed with the alcohol, glycerin and purified talc, 7.00 Gm. Allow the mixture to stand for 24 hours and filter through paper, or filter immediately.

Vehicle peppermint, cinnamon, etc., may be prepared by simply adding 20 parts of glycerin to 80 parts of the respective medicated waters.—Midl. Drugg. and Pharm. Rev., Febr., 1910, 32-33.

Elixir of Gentian, N. F.—Modification of Formula.—George M. Beringer, believing the process of detannating the gentian both unnecessary and harmful, suggests the addition of an alkali citrate which prevents the tendency of iron salts to blacken the elixir when used in connection therewith, and proposes the following as a substitute for the present N. F. formula :

Fluidextract of gentian	35 Cc.
Comp. spirit of cardamom	15 Cc.
Sodium citrate	30 Gm.
Glycerin	50 Cc.
Syrup	250 Cc.
Alcohol	200 Cc.
Purified talc	20 Gm.
Water, a sufficient quantity to make	1000 Cc.

Dissolve the sodium citrate in 350 Cc. of water. Add to this solution the fluidextract of gentian and then the glycerin. Mix the comp. spirit of cardamom and the alcohol, and gradually add this to the other mixture, shaking well after each addition. Then add sufficient water to make the product measure 1000 Cc. Add the purified talc and filter.—Proc. Penna. Pharm. Assoc., 1909, 538-539.

Elixir Gentianæ Glycerinatum may be improved, according to J. Diner, by using compound spirit of orange as a flavoring, according to a formula which he proposes in the "Proceedings," 1909, 1161.

Elix. Iron, Quinine and Strychnine Phosphate, U. S. P., viii—Modification of Formula.—Adolph F. Marquier proposes the following modification of the official formula for elixir of iron, quinine and strychnine phosphate?

Ferric phosphate (soluble)	32.0 Gm.
Quinine phosphate	8.5 Gm.
Strychnine phosphate .....	.24 Gm.
Oil Sweet Orange	2.0 Cc.
Alcohol	250.0 Cc.
Glycerin	300.0 Cc.
Distilled water, a sufficient quantity to make	1000. Cc.

Dissolve the ferric phosphate in 300 Cc. of distilled water by cold maceration; dissolve the quinine and strychnine phosphate in 150 Cc. of hot water; dissolve the oil of sweet orange in the alcohol; now add the alkaloidal solution to the glycerin, then the iron solution, alcoholic solution and enough distilled water to make 1000 Cc. Lastly, allow to stand 24 hours and filter. Preserve in dark bottles.—Proc. N. J. Pharm. Assoc., 1909, 47.

Elixir of Phosphate of Iron, Quinine and Strychnine.—Improvement of U. S. P. Formula and Manipulation.—S. A. Sharp says that the working process of the official "Elixir of Triple Phosphate" requires much care and accuracy in manipulation and that the formula is improved by the addition of one grain of potassium citrate to the fluidounce, whereby all of the ingredients are rendered soluble and compatible. By carefully following the formula and directions here given a permanent preparation is speedily obtained;

Strychnine phosphate.....	0.275
Quinine phosphate.....	8.75
Iron phosphate.....	17.50
Acid phosphoric (85 per cent)	2 Cc.
Potassium citrate	1.00
Dilute alcohol	150 Cc.
Distilled water	150 Cc.
Elixir of orange—q. s	1000 Cc.

Dissolve the phos. iron scales in 150 Cc. dist. water with heat; and the phosph. quinine in 150 Cc. dil. alcohol containing the phosphoric acid. To the solution of phos. iron add the citr. potass. and the phosph. strychnine. Heat the Elixir of Orange to about 100° F. in a closed vessel and add the solution of phosph. quinine and lastly the solution containing the iron, strychn. and potass. citr. previously warmed to about 100° Fahr. Filter, if necessary, and protect from light, in dark amber bottles. Pacific Pharm., Jan., 1910, 290-291.

Compound Elixir of Pepsin—Improved Formula and Title.—Having become convinced by personal observation as well as from the literature that compound elixirs of the digestive ferments have an extensive use in medical practice, George M. Beringer maintains that it is not within the province of the National Formulary to recommend, nor to advise, nor to question, the therapeutic action of remedies dispensed on physicians' prescriptions, and that as long as it makes no claim for the product it is only filling its mission and keeping well within its intended scope by simply supplying approved formulas. The question of the therapeutic incompatibility is one that the pharmacist cannot consider and, if introduced, would certainly queer many prescriptions. While, therefore, not in the least defending either the therapeutic action or the chemistry of these compound

preparations of the digestive ferments, the author insists that a necessity exists for the retention in the N. F. of one, the "Compound Digestive Elixir," for which he proposes an improved formula and the changes of title to "Compound Elixir of Pepsin." It is proposed to have the elixir approximately represent one-tenth of the powder, or 100 Gm. of compound powder of pepsin in 1 liter of elixir. The flavoring is orange, and by the use of powdered cudbear a greater uniformity in product of different stores will be secured.

The following formula is submitted :

Elixir Pepsini Compositum. (Compound Elixir of Pepsin.)

Pepsin (soluble "scale or granular" variety).....	15 Gm.
Pancreatin.....	15 Gm.
Diastase.....	1 Gm.
Lactic acid.....	1 Cc.
Hydrochloric acid.....	2 Cc.
Glycerin.....	250 Cc.
Alcohol.....	200 Cc.
Oil orange.....	2 Cc.
Cudbear.....	1 Gm.
Water, a sufficient quantity to make.....	1000 Cc.

Mix the acids with the glycerin and 500 Cc. of water, add the pepsin, pancreatin and diastase, and macerate with occasional agitation until solution is effected. Then add gradually the alcohol, in which the oil of orange has been dissolved, agitating after each addition. Now add the cudbear and sufficient water to make the preparation measure 1000 Cc. Macerate for six hours with occasional shaking and then filter.—*Amer. Jour. Pharm.*, July, 1909, 331-336.

. *Elixir of Lactated Pepsin* is the title of a paper presented to the Association by W. A. Pearson, which appears in the "Proceedings," 1909, 905-907.

Essence of Pepsin, N. F.—Satisfactory Stability.—Mrs. D. V. Whitney, referring to the statement sometimes made that essence of pepsin, N. F., rapidly deteriorates, becomes unsightly and inert, brings experimental evidence that this preparation compares favorably with the most popular proprietary article. A sample prepared in conformity with the N. F. formulas, originally having a pepsin content corresponding in strength to 1 : 2600, after four months was perfectly clear and proved to have a pepsin content corresponding to a 1 : 2365 strength by the U. S. P. test, and after two years still showed a pepsin value of 1 : 1183. During the same time the proprietary article under identical conditions had depreciated to 1 : 916 pepsin value. The milk-curdling effect of the two specimens, similarly, showed a celerity in forming a coagulum which was decidedly in favor of the N. F. preparation.—*Proc. Mo. Pharm. Assoc.*, 1909, 103.

EMPLASTRA.

Plasters in the Pharmacopœia—Necessity for Revising their Formulas.—Fred. B. Kilmer has contributed an exhaustive paper in which he criticises the shortcomings of the U. S. P. in the changes effected at the last revision in the formulas for plasters. These shortcomings are mainly the result of the change in the composition of the base of the plasters, by which the attempt was made to convert the adhesive plaster into a "rubber adhesive plaster." He arrives at the conclusion that the mass or base introduced into the U. S. P. under the head of "Adhesive Plaster" should be abandoned, and that a mass or base more nearly resembling that of the lead plaster of 1890 be restored; and, furthermore, that if such a course be possible, the alternative use of any India rubber mass such as now employed by manufacturers be allowed. Also, that assay processes be prescribed for all plasters containing alkaloids or definite medicinal components.—Proc. N. J. Pharm. Assoc., 1909, 105-113.

Medicinal Plasters—Assay.—Frederick B. Kilmer says that prior to the issue of the U. S. P., VIII, no authoritative process of assay of any medicinal plaster appeared in that work. In this revised edition a process is given for the assay of mydriatic alkaloids in belladonna plaster, but he finds it a very difficult matter to make this assay, chiefly because of the rubber base, and considers it probable that similar difficulty will arise from the same cause if an assay is attempted of the other rubber-base plasters. He has worked out assay processes for belladonna plaster, salicylic acid plaster, mercurial plaster, ammoniac and mercury plaster, and iron plaster, which he submits for possible use in the revision of the U. S. P.—Amer. Journ. Pharm., March, 1910, 112-118.

Rubber Adhesive Plasters—Formulas Adopted by the Medical Administration of the German Army—After a review of the conditions that are required to produce rubber adhesive plasters of uniform and satisfactory efficiency, Budde communicates the following formulas which have been officially adopted by the medical administration of the German army after comprehensive studies and experiment:

I. Rubber Adhesive Plaster.

134.0 anhydrous woolfat are melted with 16.0 copaiba and the mixture is heated for a short time to 100° C. The partially cooled mixture is then dissolved in 60.0 petroleum benzin, and when cool a solution of 50.0 caoutchouc (Para) in 300.0 petroleum benzin is added. The whole is then intimately mixed by agitation with a finely-divided trituration of 50.0 powdered orris rhizome and a sufficient quantity of petroleum benzin, and is ready for use. It is spread upon unstarched "shirting" so as to form a total thickness of 0.9 mm.

II. Rubber Plaster with 20 Per Cent. Zinc Oxide.

134.0 anhydrous woolfat and 16.0 copaiba are melted together, heated for a short time to 100° C., allowed to cool, and triturated with 57.0 zinc oxide and 27.5 powdered orris rhizome so as to form a homogeneous ointment. The mixture is then gently heated, diluted with 60.0 petroleum benzin, and intimately mixed by shaking with a solution of 50.0 caoutchouc (Para) in 300.0 petroleum benzin.

This mixture may then be spread at once on unstarched "shirting" (64 threads to the Sq. Cm.) to the thickness of 0.9 Mm.—Pharm. Ztg., liv (1909), No. 52, 507.

Rubber Plaster, Fr. P.—Unsatisfactory Formula.—The formula of the recently published French Pharmacopœia is unfavorably commented on by L. Cavailès and C. Pepin. The official directions require the rubber to be dissolved in benzin; and dammar, separately, in a mixture of oil of turpentine and alcohol. Beeswax and woolfat are to be melted on the water-bath and mixed with liquid paraffin. The rubber solution is then to be mixed with this, and the mixture is allowed to cool. Then the dammar solution is to be added carefully, and the whole is to be heated on the water-bath at a temperature not exceeding 50° C. until the volatile ingredients have been evaporated. The residue is to run into a pot. This process is condemned as unnecessarily complicated and wasteful. The alcohol and oil of turpentine are needless. The solid consistence is not convenient. The dammar is simply melted on the water-bath with the wax, wool fat, and liquid paraffin. The warm liquid is strained through muslin and the solution of rubber in benzin is added. This gives a semi-liquid mass, which keeps well in a closed vessel, and is readily incorporated with other ingredients in the cold. Its consistence is well suited for spreading. After drying in the air for two or three hours it has a good adhesive surface.—Pharm. Jour. and Pharmacist, May 21, 1910, 645; from Journ. de Pharm. et Chim., 1910, 1, 393.

Lead Plaster—New Formula.—Fr. Bergh recommends the following new formula for lead plaster:

Lithargyrum	50.0
Acid, olein depur.....	90.0
Stearinum	10.0
Glycerinum	3.0
Spiritus concentratus.....	10.0

—Pharm. Ztg., liv (1909), No. 62, 601; from Svensk. Farmaceutisk Tidskrift, 1909, No. 14.

EMULSA.

The *Emulsions of the National Formulary* are the subject of some notes by A. B. Stevens, which appear in the "Proceedings," 1909, 974-975.

Commercial Emulsions—Method of Determining the Oil Content.—In the course of an examination of a large number of commercial emulsions, E. W. Pollard perfected a "dry" method of assaying the amount of oil in them, which possesses a number of advantages over the method commonly in use—such as milk analysis—and is described as follows: A small "mound" (about 5 Gm.) of dried sodium sulphate is made in a watch-glass, and a "crater" capable of holding 2 Gm. is formed on top. The weight is taken, the "crater" filled with emulsion, the weight again taken, and the contents of the watch-glass tipped into a mortar; the glass will be left perfectly clean. After absorption of the emulsion the sulphate is triturated and the small nodules formed broken up by the addition of 10 Gm. of coarse sand. The powder thus formed is transferred to the extractor and the mortar rinsed twice with carbon tetrachloride. Extraction is allowed to go on vigorously for two hours. In this way an anhydrous solution is obtained which, after the distillation of the solvent, requires only an hour to dry in the water-oven; nor should longer be allowed. During the drying the flasks are preferably laid on their sides to allow the escape of the heavy carbon tetrachloride vapor. The iodine figure may be obtained by a second extraction, using the carbon tetrachloride solution without distillation. The process is also suitable for malt and oil, providing only a small quantity be taken. Concerning the

Preparation of Emulsions, the author gives decidedly the preference to the method as exemplified in the *Emulsio Olei Morrhue*, B. P. C., which consists in mixing the powdered acacia with the whole of the oil, then adding the water *secundum artem*. The "alternate" method of the B. P. C., as exemplified by *Emulsio Olei Morrhue Comp.*, is successful only when the proportion of oil is sufficiently high to form a jelly. A third method, by "churning," is adapted only to large quantities, and then only when the menstruum is quite thin; with thick emulsions the manipulation is not easy nor, in the author's judgment, satisfactory. *A good pharmaceutical emulsion*, in addition to keeping qualities, is one—(1) which is no more viscous than glycerin; (2) in which the globules do not exceed 15 μ ; (3) which on dilution throws down no sediment.—*Trans. Brit. Pharm. Conf.* (Yearbook of Pharmacy), 1909, 266–278.

Emulsion of Iodoform—Preparation Suitable for Surgical Dressing.—P. I. Minton recommends the following formula for an emulsion of iodoform which remains indefinitely perfect and is free from the undesirable adhesiveness imparted by the ordinary emulsifying agents:

Iodoform, a sufficient quantity.	
Hydrous lanolin.	2 ounces.
Cottonseed oil, enough to make.....	1 pint.

Triturate the iodoform with enough cottonseed oil to form a smooth

paste. Add the lanolin, rub the mass until smooth, and then add the remainder of the oil with constant trituration.—Bull. Pharm., Nov., 1909, 472.

EXTRACTA.

Plant Extracts.—Preparation in an Unaltered Active Condition.—A. Goris describes a method devised by Perrot and himself for destroying the natural ferments of plants and extracting their active principles in the actual state in which they exist in the plant tissues. Alkaloids and glucosides are often found in fresh plants in complex combinations with tannins or other bodies, in a condition which renders them soluble in water and in alcohol, but insoluble in ether and in petroleum ether. The authors subject the fresh plants to the action of the vapors of neutral liquids boiling below 100° C. This treatment kills the natural ferments, without the material coming into contact with the liquid. The plants are then dried, powdered, extracted with alcohol, 80 per cent., and the alcoholic extract is evaporated, *in vacuo*, without heat. The semi-solid extract is then kneaded under anhydrous ether, which removes chlorophyll and fat. The residual extracts are of different colors, according to their source. They are soluble in water, and the authors claim that they contain all the active principles of the fresh plant in an unaltered state. Pharm. Journ. and Pharmacist, Sept. 18, 1909, 365; from Journ. de Pharm. et Chim. 30 (1909), 186.

Solid Extracts.—Valuation.—In the course of an interesting review of the pharmacological and chemical history of tansy (*Tanacetum vulgare*), H. Matther and H. Serger direct attention to the insufficiency of determining the value of many solid plant extracts on the basis of alkaloidal or glucosidal constituents and, *per contra*, the possibility of arriving at a more satisfactory valuation of the same by extending the field of research and observation to constituents of a more or less indifferent or inactive nature, such as tannins, resins, fats and the like, which when determined according to a general scheme might yield constants that admit of drawing definite conclusions. Thus, for example, the authors have recently determined in

Tanacetum Extract, prepared from the flowers of the plant by extraction with alcohol, certain resins, fats, tannins, bitter substances, and alkaloidal bodies, without, however, reaching any definite conclusions, owing to the impossibility of isolating the bitter principles and alkaloidal bodies quantitatively. The valuation of such extracts therefore becomes possible only on the basis of the more or less indifferent constituents, which may serve as constants for the particular extract under a uniform scheme of examination adapted to solid extracts in general. Such a scheme is described by the authors, and has been applied in three parallel experiments to the extract of tansy under examination, with the following results:

	Per Cent.	Per Cent.	Per Cent.
Substances insoluble in water.....	34.17	35.28	34.60
Alcohol—soluble resin.....	12.44	12.51	11.85
Ether—soluble resin.....	1.717	1.729	1.84
Fat.....	6.615	6.934	6.821
Fatty acids.....	2.930	2.603	2.681
Unsaponifiable matter.....	1.617	1.826	1.535
Substances precipitable by solution of			
lead subacetate.....	20.07	20.36	21.11
Water.....	7.25	—	—
Ash.....	13.61	—	—
Acid number.....	3.9	—	—
Tannins.....	11.528	—	—

—Apoth. Ztg. xxiv (1909), No. 64, 575-577.

Purified Extracts—Preparation from Aperient Drugs.—Knoll & Co. have patented a method for removing the inert constituents of certain aperient drugs (thus rendering them more effective and more acceptable to the stomach) by treating the alcoholic extraction with ether, and adjusting the ethereal extract obtained with milk sugar to a definite pharmacological activity. So, for example, 1 Kgm. of rhubarb root is extracted with two successive portions of 5 liters of alcohol, and the extract, either at once or after concentration, is treated with ether as long as a precipitate is produced. This is removed by filtration, the ether and alcohol are distilled off from the filtrate, and the residue is adjusted to the required strength with milk sugar. The yellow powder so obtained, although not quite soluble in water, is perfectly soluble in diluted alkalis, forming a deep red solution.—Pharm. Ztg., liv (1909), No. 89, 880.

Solid Extracts—Preservation in Collapsible Tubes.—A writer (H in B) suggests the preservation of solid extracts that are but rarely called for in collapsible tubes lined with wax paper. The extracts are thus protected from the action of the air, retain their plastic condition, and are dispensed with economy and cleanliness.—Pharm. Ztg., lv (1910), No. 38, 388.

Solid Extracts—Preservation in Screw-cap Jars.—Frommann directs attention to the use of screw-cap glass jars, which are obtainable in all desirable sizes, as preferable to the collapsible tubes suggested by "H in B." Contact with the metal of the screw-cap is prevented by interposing a disc of corkwood, or thin linoleum. When the quantities of extract are small, the diminutive jar is encased in an ordinary shop jar, with loose cover, the interior (bottom) lined with a pad of felt. With these precautions the extract is protected from the influence of air and dust, and is conveniently available in good condition until completely consumed.—*Ibid.*, No. 45, 459.

Extract of Belladonna, Fr. Pharm.—Alkaloidal Strength.—An extract of belladonna prepared by André according to the process of the French

Pharmacopœia, 1908, gave 2.28 per cent. of alkaloids calculated on the dry extract. Two commercial extracts yielded 2.14 and 2.37 respectively. The French Pharmacopœia, 1908, does not give any alkaloidal standard for this extract. The Belgian, Swiss, and German Pharmacopœias require 1.5 per cent. The requirements put forward by Grimbert and Warin, 4 to 5 per cent., are evidently unattainable at present. Pharm. Journ. and Pharmacist, Oct. 9, 1909, 451; from Journ. de Pharm. et Chim. 30 (1909), 249.

Bitterless Extract of Cascara Sagrada.—Preparation with Zinc Oxide.—The "Journal de Pharmacie d'Anvers" publishes a method for preparing bitterless extract of cascara sagrada in which zinc oxide is satisfactorily used in place of calcined magnesia. 1000 Gm. of powdered cascara bark and 80 Gm. of zinc oxide are intimately mixed, sufficient hot water is poured on the mixture to well cover it and it is allowed to stand 8 or 10 hours at 60° to 70° C. After cooling it is expressed, and the maceration with hot water is repeated several times in the same way. The united infusions are filtered and evaporated in a vacuum to dryness, the yield being about 23 per cent. of a brown, scarcely hygroscopic extract, readily soluble in water, and completely free from bitterness. Pharm. Ztg. liv (1909), No. 61, 594.

Extract of Kola, Fr. P.—Official Caffeine Content not Attainable.—J. Warin says that the official powdered kola of the Fr. P. is required to contain 1.25 per cent. of caffeine, and the official extract, prepared with 60 per cent. alcohol, should be obtained in a yield of about 12 per cent. of the original powder, and is required to contain at least 10 per cent. of caffeine. Operating strictly by the official directions with powdered kola containing 1.8 per cent. of caffeine, 14.7 per cent. of extract was obtained which contained 5.4 per cent. of caffeine only. Another portion of the same extract which had been prepared without the filtration directed, yielded 16.5 per cent. extract containing, however, 7.75 per cent. of caffeine. It is apparent from this that a portion of caffeine is removed from the aqueous residue, remaining after distilling off the alcohol, if, as directed, it is submitted to filtration before evaporation.—Pharm. Journ. and Pharmacist, June 18, 1910, 760; from Journ. de Pharm. et Chim., 1910, I, 543.

Licorice Extracts—Analysis of Commercial Sorts.—Ernest J. Parry contributes an interesting and exhaustive paper on the "Licorice-juice of Commerce," in which he points out that licorice varies so enormously according to the country in which it is grown, and even the locality in the same country, that it would be very inadvisable to attempt to lay down any standard figure for the commercial product. The principal variation is in the amount of glycyrrhizin contained in the root, which may be twice as much in a root grown in one district as in one grown elsewhere. Nevertheless, these juices (extracts) may be divided into three distinct species,

viz., (1) *Calabrian juice*, the type of the ordinary edible juice, containing 10 to 15 per cent. of glycyrrhizin, and used in the manufacture of stick licorice; (2) *Anatolian juice*, containing from 17 to 25 per cent. of glycyrrhiza, but too bitter to be palatable. This is the type of juices (forming the pure black extract), used in manufacturing, but never made into stick licorice. (3) *Sweet Spanish juice*, frequently containing 6 per cent. or less of glycyrrhizin, and not considered valuable. The author has prepared extracts of licorice from parcels of authentic root from the places of their origin, which, by the process of analysis employed and described in detail, fully verified the authenticity of the samples described in the following tables:

Italian (Calabrian) Juices (Stick and Block).

	1	2	3	4	5	6
Moisture	13.50	12.80	10.95	14.65	11.85	13.60
Ash	6.20	5.98	7.10	6.69	7.55	5.95
Soluble in water	63.90	69.25	63.90	64.80	64.65	65.90
Insoluble in water	22.60	17.95	25.15	20.55	23.00	20.50
Starchy and gummy matter.	21.48	20.90	22.80	24.50	26.00	25.25
Glycyrrhizin	9.95	10.18	12.50	11.42	10.50	10.50
Sugars before inversion	12.50	13.50	12.90	13.00	12.00	11.90
Sugars after inversion	15.25	14.95	14.90	15.50	14.70	14.50

Anatolian and Similar Juices (Block).

	1	2	3	4
Moisture	18.95	20.50	17.55	16.95
Ash	6.80	6.90	7.22	5.80
Soluble in water	73.55	72.45	75.55	74.55
Insoluble in water	7.50	7.05	6.90	8.50
Starchy and gummy matter	18.61	19.00	17.50	19.65
Glycyrrhizin	23.50	18.75	20.40	21.55
Sugars before inversion	11.50	12.00	10.94	10.88
Sugars after inversion	12.90	13.90	13.20	13.00

Spanish Juices (Block).

	1	2	3
Moisture	9.40	10.50	8.55
Ash	6.50	5.95	7.12
Soluble in water	68.55	65.00	64.90
Insoluble in water	22.05	24.50	26.55
Starchy and gummy matter	20.48	21.00	23.50
Glycyrrhizin	6.50	5.95	6.65
Sugars before inversion	14.50	13.09	12.50
Sugars after inversion	15.08	15.25	14.45

From an examination of numerous samples of extracts made by the author from different roots, he was unable to find any licorice juice of authentic origin which differed materially from the above described types.

Regarding licorice extracts from France and Belgium, in which countries, so far as the author has been able to ascertain, no licorice root is grown, the roots or block juice are imported, and the sticks are moulded, usually with the addition of saccharine matter. From reports of the White Cross Congress, together with his own examination of a large number of doubtful or adulterated samples, of which the following are typical, it appears that the greater part of the French and Belgium licorice-juice is a mixture of pure juice and added saccharine matter.

Doubtful or Adulterated Samples.

	1	2	3	4	5	6	7
Moisture	13.50	12.95	12.50	12.90	13.50	14.00	13.25
Ash	3.9	4.7	5.0	4.2	4.6	6.1	4.95
Soluble in water	80.50	78.00	80.56	74.50	77.0	74.60	76.90
Insoluble in water	6.0	9.05	6.94	12.60	9.5	11.4	9.85
Starch and gummy matter	17.41	16.50	18.00	17.50	16.90	17.05	16.05
Glycyrrhizin	6.40	7.00	7.25	14.25	16.50	8.12	16.00
Sugars before inversion	9.8	12.50	14.00	10.50	18.00	11.5	11.00
Sugars after inversion	24.5	19.5	26.5	18.6	20.50	23.1	19.9

In these samples the low ash, high amount of matter soluble in water, low starch and gummy matter and high sugar values are significant.—*Chem. & Drugg.*, Jan. 1, 1910, 21-22.

Extract of Licorice.—Contamination with Metallic Copper.—Fr. Wandersleben directs attention to the not infrequent occurrence of particles of metallic copper, plainly visible under the lens in some instances, in others embedded in the mass. He attributes its presence to attrition and scratching during the stirring of the mass and removal from the copper kettles in which it is prepared. *Pharm. Ztg.* lv (1910), No. 6, 58.

Malt Extract.—Requirements of a Properly Prepared Article.—In the mashing of malt, as is well known, the starch undergoes hydrolysis under the influence of the diastase, and is transformed partly into maltose and partly into maltodextrin. Max Hamburg points out particularly that this formation of maltodextrin takes place under all circumstances, and that in his experience it never falls short of 10 per cent. of the maltose produced at the same time. Other important constituents of malt extract are the proteins which have been rendered soluble by the action of the malt peptase, and which for the most part belong to the class of albumoses. Further, in a properly prepared malt extract there will be found a quantity of active enzyme, principally diastase, and, whether the extract is intended

for medicinal use or for dietetic purposes, all of these constituents—maltose, dextrin, proteins, and diastase—ought to be present in due proportions. In examinations of a large number of perfectly pure malt extracts, the dextrin figure never dropped below 8.2 per cent. and usually ranged from 9 to 14 per cent., rarely above, and it contained from 5 to 7.8 per cent. of protein, together with 1.5 to 1.8 per cent., of mineral matter, in the dry solids. The diastatic efficiency of a malt extract should not fall below 3.8 Mgm. of maltose with one gramme of extract when acting on starch paste by one of the methods in vogue.

Adulterations of malt extracts are increasingly frequent. The principal adulterants found by the author have been materials containing dextrose, such as starch syrup, molasses, etc., and some malt extracts have been found to consist solely of saccharified potato starch with the addition of a little malt. In view of the generally unsatisfactory character of commercial malt extracts, the author considers it very desirable that uniform methods for their examination be established.—Pharm. Journ. and Pharmacist, July 31, 1909, 133.

Malt and Cod Liver Oil—Commercial Variation.—E. F. Harrison contributes an instructive article on variations observed in extracts of malt with cod liver oil on the English market. His examinations comprise nine popular brands, four supplied by large retail concerns, and six supplied by manufacturing houses as "own name specialties" to pharmacists. The latter contained from 1.5 to 10.3 per cent. of oil only, and by the author's method (described in Proceedings 1909, 76) showed a diastatic value of from 9 to 150, with a content of from 59.2 to 72.9 per cent. of maltose in extract. The second lot mentioned showed: Oil, 2.1 to 10.1 per cent.; maltose, 55.9 to 69.1 per cent.; diastatic value, 10 to 104. The first mentioned (nine samples) gave: 3.6 to 33.8 per cent. of oil, 53.6 to 75.2 per cent. of maltose, and a diastatic value of 5 to 776. The author describes simple methods for determining the oil and maltose in the preparation.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 335-337.

Extractum Malti cum Oleo Morrhuæ is suggested for inclusion in the N. F. by Hugh Craig, who gives a formula in the "Proceedings," 1909, 1154.

Extract of Meat—Presence of a Basic Constituent in Large Proportion.—R. England says that among the constituents of Liebig's extract of meat a base of the formula $C_7H_{11}NO_3$ occurs in large quantities, for which he suggests the name—

Carnetine. From its reactions it is found that—(1) it contains a carboxyl group; (2) it contains a hydroxyl group in the α -position with regard to the carboxyl; (3) it contains a trimethylamine residue bound to the carbon atom which is in the γ -position with regard to the carboxyl group. Thus it is an α -oxy- γ -trimethylaminobutyric acid of normal struc-

ture. Its chloride has the formula $\text{Cl}(\text{CH})_3\text{N}.\text{CH}_2.\text{CH}_2.\text{CH}(\text{OH}).\text{COOH}$.—Chem. News, Oct. 1, 1909, 172; from Ber. d. D. Chem. Ges., 42 (1909), No. 11.

Albumen-meat Extract—A Stable Substitute for Natural Meat Juice—Reviewing the historical facts connected with the introduction and uses of fresh meat juice, following the suggestion of Liebig (in 1854), of an infusion of fresh meat as a stimulant-nutrient for the sick, a writer, over the signature "K. W.," recommends the following formula for a concentrated albumen-meat extract, which keeps well and efficiently replaces all the substitutes for meat juice that have heretofore been prepared, as well as the freshly-prepared meat juice prepared by expression. The necessary materials are a good meat extract and carefully-prepared dried-egg albumen—600.0 Gm. of the dried albumen, in pieces, and 600.0 Gm. of cold well-water are placed in a porcelain or stoneware vessel and allowed to stand about 18 hours at the ordinary temperature; then solution is effected by gentle stirring and the egg-membrane is removed by straining the solution through fine-meshed gauze. To the strained liquor 800.0 Gm. of meat-extract are added and after one to two hours mixed by gently stirring, to avoid formation of froth. The preparation so obtained has the consistence of a thin extract, sufficiently fluid to be poured from the container, and is not changed on exposure for two weeks in the incubator at 37° C. It contains 30 per cent. of albumen. If desirable, celery salt or some other condiment may be added to correct the taste.—Apoth. Ztg., xxv (1910), No. 39, 348.

FLUIDEXTRACTA.

Fluidextracts—Question of Preparation by Retail Pharmacists.—Friedrick J. Blumenschein discusses a question which cannot be impressed too strongly upon pharmacists, namely the question of practicability for the retail druggist to prepare in his own laboratory the fluidextracts which he is called upon to dispense. He says that the manufacturers have so repeatedly impressed upon the druggist his (the druggist's) inability to make and assay his own fluidextracts, that he has come to believe in it to such an extent that he buys all his fluidextracts with the firm conviction that time and money are saved. But, the author contends that, with two possible exceptions—senna and licorice—all the U. S. P. fluidextracts can be made in quantities of one-half pound upward cheaper than they can be purchased. The strongest argument the salesman can offer is that his fluid-extract does not precipitate; this is not true, for all of them precipitate upon ageing and exposure to light and air. But the large manufacturer carefully ages and filters his compounds—this requiring from two months to a year. The author follows these preliminary remarks with some brief practical suggestions which will repay consultation in the original paper, which appears in Proc. Penna. Pharm. Assoc., 1909, 187–189.

Fluidextracts—Value of Glycerin as Solvent and Preservative.—At the meeting of German Naturalists and Physicians in Salzburg, 1909, Dr. Richard Firlas described a series of experiments undertaken with the object of ascertaining the value of glycerin as a solvent for the active constituents of drugs in the preparation of fluidextracts by percolation, and the influence of glycerin on their stability, etc. Selecting *cinchona*, *kola*, *condurango*, *hydrastis* and *ergot* as typical examples, he arrived at the following conclusions: The presence or absence of glycerin in the menstruum does not affect the amount of alkaloid or glucoside in the fluidextracts from any of these drugs, the differences, if any, being so small as to be quite negligible; but their stability is affected to a greater or less extent, the alkaloid or glucoside being diminished more rapidly in fluidextracts prepared without glycerin than in those prepared with a menstruum containing glyceriu, this diminution being greater in the case of cinchona and kola, less in condurango, scarcely appreciable in hydrastis, and inappreciable in ergot. The same rule holds good for the total residue of evaporation, which diminishes more rapidly in the fluidextracts prepared without glycerin than in those prepared with glycerin. In either case, however, the diminution of alkaloid, glucoside or total extractive is relatively greatest during the first year, is then gradually minimized, and finally remains constant; but in the case of the fluidextracts prepared with glycerin the diminutions in alkaloid and glucoside values fluctuate during the first three years within such narrow limits as to become practically negligible. On the basis of these observations the fluidextracts of cinchona and kola should be made with glycerin, those of condurango and hydrastis are advantageously made with glycerin, and in fluidextract of ergot glycerin is not necessary.—Apoth. Ztg., xxiv (1909), No. 77, 721-722.

Fluidextracts.—Preparation by Extraction under Pressure.—L. Kroeber, after discussing the limitations and imperfections of the percolation methods in use for preparing fluidextracts, records the results of comprehensive experiments made by the method of extraction recommended some years ago (1904) by Bruns, who described an apparatus for this purpose consisting in its essentials of a cylindrical hydraulic press. Although experiments made by J. Herzog in 1905, in the pharmaceutical Institute of the University of Berlin, by Brun's method, failed to lead to satisfactory results, Kroeber now finds that by observing certain conditions—small quantities of the solvent, 3-4 successive expressions, etc.—fluidextracts are obtainable by this method, which meet all requirements, and which yield a dry residue of evaporation only inappreciably less than that yielded by fluidextracts made by percolation. Pharm. Zentralh, 51 (1910), No. 3, 41-47.

Fluidextracts.—Identification.—H. M. Gordin summarizes the points brought out by him in his paper on the indentification of fluidextracts

read before the Chicago Branch of the A. Ph. A. in 1909. This summary appears in the "Proceedings," 1909, 886-888.

Fluidextract of Buckthorn Berries—Preparation.—George M. Beringer and George M. Beringer, Jr., recommend the following method of preparation for a fluidextract of buckthorn berries: Add 1000 Gm. of the ground berries to 5 liters of boiling water, allow to infuse for two hours, and express; then infuse the dregs with 3 liters of boiling water in the same way and express; mix the expressed liquids, and evaporate to 750 Cc. When cold, add 250 Cc. of alcohol; allow the mixture to stand a few days, filter, and wash the filter with sufficient of a mixture of 1 volume of alcohol and 3 volumes of water, to make 1000 Cc. A satisfactory preparation can also be made by percolation, *using diluted alcohol*, in the usual way. Percolation with weaker alcohol was found impracticable owing to the gummy character of the drug.

Fluidglycerate of Buckthorn Berries can be prepared by the type process proposed by one of the authors (see Proceedings 1908, 981), but the percolation is very slow and tedious.—*Amer. Journ. Pharm.*, July, 1909, 325.

Fluidextract of Cascara Sagrada—Use of Ammonia to Effect More Complete Extraction of the Bark.—Charles Symes finds that when fluidextract of cascara sagrada is prepared according to the formula of the B. P., the addition of ammonia water to the marc after the bark is exhausted by water alone, and then the continuation of percolation with water, results in the extraction of additional aperient matter. He has utilized this observation in the preparation of this fluidextract from 28 lbs. of bark, modifying the process also by using chloroform water instead of pure water to apparent exhaustion; then following this by the addition of 2 gallons of chloroform water and 10 ozs. of liq. ammoniæ, B. P., and continuing the percolation to obtain a second percolate, which was evaporated to 16 fl. ozs., added to the concentrated first percolate to which 2 pints of glycerin had been added during evaporation. This was then adjusted to the proper volume by the addition of diluted alcohol.—*Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy)*, 1909, 319-320.

Fluidextract of Rhamnus Purshiana—Characters of Identity.—In connection with an elaborate investigation of the bark of Rhamnus Purshiana and R. Frangula, L. Kröber describes the following characters by which the identity and quality of a properly-prepared fluidextract of Rhamnus Purshiana may be established: The fluidextract should be dark-red brown, should have a peculiar bitter taste, and should form a turbid liquid when mixed with 10 parts of water, while the precipitate produced thereby should be yellow-brown, but by no means coffee- or chocolate-brown. The specific gravity of the fluidextract at 15° C. should be from 1.060 to 1.070, never less than 1.050, and the dry residue of evaporation should

weigh at least 20 per cent. of the weight of fluidextract taken. The mineral constituents (ash) should not exceed 1.2 per cent. If 1 Cc. of the fluidextract, diluted with 1 Cc. of water, is shaken with 10 Cc. of ether, and 5 Cc. of the clear yellow ether-layer are shaken with 5 Cc. of water and a few drops of ammonia, the aqueous layer should acquire a deep cherry-red color. The filtrate of a mixture of 1 p. of the fluidextract and 9 p. of water should give with solutions of tannin, of corrosive sublimate, of ferric chloride, of ammonium molybdate, and of acetic acid, an immediate turbidity, followed by the formation of precipitates in the course of some time.—Pharm. Ztg., lv (1910), No. 37, 376; from Pharm. Praxis, 1910, No. 1.

Fluidextract of Ergot—Chemical Assay.—John R. Rippetoe has subjected some specimens of fluidextract of ergot, which he had tested during the past three years by observing their action on the cock's comb, to examination by the "benzol extract" method recently proposed by Dr. Horatio C. Wood, Jr. (see Proceedings 1909, 151), and communicates the results in some detail. While, as a matter of course, no previous assays of the benzol extracts could be made—the process being unknown—it is noteworthy that they contain a proportionally lower amount of extract according to age, the quantity varying from 0.14 Gm. in 100 Cc. of fluidextract made in 1907 to 0.56 Gm. in 100 Cc. of extract made in 1909. It is noteworthy also that larger doses of the preparations were required after eight months' ageing to produce the desired action upon the cock's comb.—Amer. Journ. Pharm., March, 1910, 119-120.

Fluidextract of Hydrastis—Simplification of G. P. Method of Assay.—Prof. E. Rupp has worked out a simplified method for the assay of fluidextract of hydrastis, G. P., for which he claims absolute reliability. In a tared Erlenmeyer flask of about 125 Cc. capacity, 10 Gm. of the fluidextract and 20 Gm. of water are evaporated by moderate boiling to from 9 to 11 Gm., to eliminate the alcohol completely. When cool, the liquid is acidulated with 1.5 Gm. diluted HCl, and adjusted with water to 20 Gm. Now 1 Gm. of talc is added, the contents of the well-corked flask are vigorously shaken during one minute, filtered, and 10 Gm. of filtrate collected in a 100 Cc. flask, in which it is well shaken with 4 Gm. of spirit of ammonia and 20 Gm. of ether during several minutes. Then 20 Gm. of petroleum ether, b. p. 40°, are added, the mixture is again thoroughly shaken, and then again after the addition of 1.5 Gm. of powdered tragacanth until the gum balls together and the supernatant liquid is clear. Of this, 32 Gm. are weighed into a tared beaker, the solvent is evaporated on a water bath, and the residue dried to constant weight. This residue represents the alkaloidal content of 4 Gm. of fluidextract; consequently multiplication of the ascertained weight by 25 gives the percentage of hydrastine in the sample.—Apoth. Ztg., xxiv (1909), No. 98, 922-923.

GLYCERITA.

Fluidglycerates have been the subject of further study and experimentation by George M. Beringer, who reports the results of his recent observations in a paper printed in the Proceedings, 1909, 1009-1014.

Glycerinum Acidi Borici, B. P.—Precautions to be Observed in its Preparation.—T. Hatfield Dyson says that no preparation so well repays a scrupulous attention to the cleanliness of the utensils as glycerin of boric acid. A perfectly clean porcelain or enameled dish and a glass rod should be used. The use of "finely powdered" acid is both unnecessary and undesirable. The crystals will serve equally well, and are much cleaner than the powder. The preliminary heating should be strictly followed, and the acid added in small portions, with constant and vigorous stirring. If the temperature is maintained at about 290° F. much time will be saved, and there is little danger of the temperature rising unduly until all the acid has been added if the mixture is vigorously stirred. After this the temperature slowly rises, and when the temperature of 302° F. is reached the weight is approximately one-eighth above that to which it should be evaporated. If, therefore, the official directions were amended, "continue the application of heat . . . until the product is reduced to 11 ounces, then add 9 ounces of glycerin," a preparation would be obtained having the physical character that is required by the physician, while considerable time would be saved in the process. The reduction to 10 ounces, as now required, is quite tedious.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 700.

Glyceritum Iodi is recommended by Franklin M. Apple for the purpose of conveniently and expeditiously preparing the ointment. A formula is given in "Proceedings," 1909, 1132-1133.

Glycerinum Plumbi Subacetatis B. P.—Modification of Process.—T. Hatfield Dyson observes that the directions of the B. P. to evaporate the prescribed quantities of ingredients for glycerin of lead subacetate to a given weight and a specific gravity of 1.48 cannot be uniformly complied with, because the weight and specific gravity are not necessarily equivalent. He therefore suggests that the directions be amended to read: *Liquor plumbi subacetatis fortis*, 20 fl. ozs.; glycerin, 20 fl. ozs. Evaporate to the weight of 33⅞ ozs., or sp. gr. 1.48.—Pharm. Jour. and Pharmacist, Dec. 4, 1909, 700.

INFUSA ET DECOCTA.

Infusions and Decoctions.—Pharmacopœial Definitions and Directions.—Dr. Bulenheim, although considering the present definition and directions for preparing infusions and decoctions an improvement on those given in previous editions of the G. P., suggests that omitting "decoctions" as an obsolete form of preparing medicinal extractions, the article on infusions might with advantage be formulated as follows:

"To prepare an infusion the drug, comminuted if necessary, is covered with (cold) water in a suitable vessel, and heated for at least 15 minutes in a water bath, stirring repeatedly. Moderately fine or coarsely comminuted drugs must be heated half an hour. The liquid is then strained while hot, unless the nature of the drug demands the contrary, and if necessary expressed."

While in the case of some drugs—digitalis, ergot, etc., it is imperatively necessary to strain the infusion while hot, in others, notably *Condrango*, it is equally necessary that the infusion is allowed to cool for some time before straining it from the dregs. The author also suggests the following general directions for preparing.

Macerations ("Aussüße" = *Extractions*) : "The drug, comminuted if necessary, is covered with the prescribed liquid and allowed to stand without the application of artificial heat, stirring occasionally. It is then strained and if necessary expressed."—Pharm. Ztg., lv (1910), No. 32, 325.

Concentrated Infusions—Rational Preparation.—C. Hartleb discusses the question of admitting concentrated infusions as substitutes for freshly prepared infusions, with particular reference to the infusions of digitalis and of *Ipecac*, and arrives at the conclusion that by adopting a rational method of preparation such concentrated infusions, possessing stability and reliability, are readily made. Taking, for example,

Concentrated Infusion of Digitalis, the author says that the glucosides digitoxin, digitonin and digitalin, are either completely or almost completely insoluble in water, and that an infusion prepared with water alone can contain only a very small proportion of these, admittedly the active constituents of digitalis leaves. But if a small percentage of alcohol is used, a 1 : 20 infusion is readily obtained, containing practically the entire glucosidal contents of the leaves, by adopting the following formula and procedure ; 20 Gm. of fresh digitalis leaves (containing at least 0.3 per cent. digitoxin) are introduced into a 500-Cc. flask with 80 Gm. of 90 per cent. alcohol and allowed to stand one hour after thorough shaking. Then 300 Gm. of boiling distilled water are gradually added to the contents of the flask, and the whole is allowed to stand, with frequent shaking, for 12 hours. The mixture is then strained, expressed, filtered and the filtrate adjusted to 400 Gm. with a mixture of alcohol and water in the proportion of 1 and 4. So obtained, the concentrated infusion possesses unlimited stability, and represents the total activity of the digitalis leaves used. In the case of

Concentrated Infusion of Ipecacuanha the conditions are practically the same. The active principles, emetine and cephaeline, are only sparingly soluble in water, but readily soluble in alcohol. It suffices, however, to use a small percentage of alcohol for the menstruum (= 15 per cent.).—Pharm. Ztg., liv (1909), No. 74, 726.

Infusion of Digitalis—Preservative Effect of Small Percentages of Alcohol.—In continuation of his valuable researches on digitalis and its preparations, Dr. C. Focke has studied the effect of adding small percentages of alcohol to the infusion with the object of correcting the taste and improving its stability. Basing his conclusions on an experience of several years with physiologically tested and assayed infusions of digitalis, he found that the addition of 5 per cent. of alcohol renders the infusion more palatable and reasonably stable within certain limits, and if as much as 10 per cent. of alcohol is added, he has found it effective within 5 or at most 10 per cent. of its original activity after keeping it for 9 months (including the winter months) in a warm place. An infusion treated with the same amount of alcohol and exposed in the spring of the year to the afternoon sun during $2\frac{1}{2}$ months, had become somewhat lighter in color, but showed no greater diminution in physiological activity than the sample protected from light. For nearly two years Dr. Focke has employed infusion of digitalis containing 5 per cent. of pure alcohol in his practice, and found it to be satisfactory in every respect, and particularly as regards stability and tolerance.—Pharm. Ztg., liv (1909), No. 77, 757; from Caesar & Loretz's Ber., Sept., 1909.

LINIMENTA.

Ammonia Liniment—Acidity of Oils a Desideratum.—Krekeler observes that in former years complaints of failure to obtain a satisfactory ammonia liniment were seldom made by the pharmacist, while modernly they are quite frequent. The liniment was then made with ordinary olive oil (ol. olivar. commun.) and there was no difficulty to obtain a handsome thick-liquid mass when the directions of the G. P. were followed. With the abandonment of the crude olive oil, prepared by more or less primitive methods and containing an abundance of free fatty acids, and the substitution by the Pharmacopœia of purer fixed oils, such as poppy oil, etc., the failures to prepare a satisfactory liniment have become numerous. This, the author maintains, is due to the very purity of the oil—its freedom from acids, and he therefore suggests the addition of olein to supply this deficiency. An excellent liniment is obtained, for example, with: Olein, 60.0; ol. papaver., 3900.0; liq. ammon. caust., 800.0. If too thick, this is readily corrected by the addition of a little water.—Pharm. Ztg., xv (1910), No. 14, 139.

Linimentum Cajuputi et Chloroformi Compositum is suggested for inclusion in the N. F. by Hugh Craig, prepared according to a formula which he gives in the "Proceedings," 1909, 1154.

Vasolimentum Salicylatum 10 per cent.—Improved Formula.—Schnabel states that the formula for 10 per cent. salicylated vasoliment proposed for the G. P. V. requires the addition of alcohol to make it satisfactory, and

therefore recommends the following modification of the formula: Shake 10 p. salicylic acid with 5 p. absolute alcohol and add 85 p. vasoliment. The preparation may also be made direct from the individual components, as follows: Mix 38 p. olein (redistilled), 38 p. liquid paraffin and 3.8 p. solution of ammon., sp. gr. 0.91, and add to this mixture a solution of 10.2 p. salicylic acid in 10.2 p. absolute alcohol.—Apoth. Ztg., xxiv (1909), No. 102, 959.

LIQUORES.

Volumetric Solutions of the U. S. P.—Metallic Silver as a Suitable Ultimate Standard.—Elias Elvove observes that the very prominent position given to volumetric analysis is in the U. S. P., and its almost exclusive use, wherever possible, in determining whether a given substance comes up to the required standard of purity, render it imperative that the most suitable ultimate standard be adopted for the necessary volumetric solutions. It is also obvious that in considering what substance might form a suitable ultimate standard for these solutions, we must place as of primary importance the readiness with which such substance is obtainable in a pure state, its stability under ordinary conditions, its possessing the necessary properties for admitting of its use in a volumetric process of proven accuracy, and finally, what likelihood there is of different operators obtaining such substance in different degrees of purity although working by the same method. After pointing out some of the objections to potassium bitartrate which is chiefly relied on as standard in the U. S. P., the author refers to the large number of substances that have from time to time been suggested and used for the same purpose, pointing out their deficiencies in some cases and pronouncing them unmistakable; arriving at the conclusion that the one substance that apparently meets all demand is "pure silver." He says, that of all volumetric processes at present known, there is probably not one that excels in elegance or accuracy the well-known Volhard method for titrating silver by means of a thiocyanate solution. In fact, its advantages are so pronounced that Shutt and Charlton have even recommended its use in estimating the very small amounts of chlorine in potable waters, in preference to the standard chromate method. Moreover pure metallic silver is obtainable with comparative ease, and by its adoption as the ultimate standard for the required volumetric solutions of the U. S. P., as he confidently advises, the way would be paved for leaving such standard supplied from one source, thus making the uniformity absolutely complete. Amer. Journ. Pharm. May, 1910, 203-211.

U. S. Volumetric Solutions are discussed by A. H. Clark in reference to their keeping qualities in a paper which appears in the "Proceedings," 1909, 874-879.

Sterile Solutions—Preparation by Pharmacists.—Clarissa M. Roehr makes some practical observations on, and gives directions for, preparing

sterile solutions, concluding with the following remarks which merit the attention of pharmacists: "The question is often asked, Can pharmacists profitably dispense sterilized solutions? There seems but one answer. The apparatus required is very simple, and when physicians see that pharmacists are prepared to do this work, it is very evident that it will add to their professional standing and also to their commercial interests."—*Pacific Pharm.*, Dec., 1909, 249-250.

Sterilized Solutions—Influence of the Components of Glass upon them.—Lesure has made some interesting observations concerning the influence of the components of the glass containers of sterilized solutions, his investigations leading to the following conclusions: For solutions containing hydrolyzable compounds (of the type of cocaine hydrochloride), vials of *neutral* glass must be used, *i. e.*, such glass as under the ordinary conditions of sterilization in the autoclave do not separate any alkali. Such suitable glasses are the Jena (Schott & Co.), the Cologne (Ehrenfeld) and the Serax glasses.

For solutions of salts forming insoluble compounds (phosphates, arsenates, etc.), calcium-free glasses, containing instead aluminum, zinc or magnesium silicate, should be used.

For substances less susceptible to decomposition, such as sodium cacodylate, methyl arsenate, strychnine salts, mercury salts, etc., glasses showing faint alkalinity, under the conditions above mentioned, may be employed.

For solutions of chlorides, bromides and iodides, glass containing lead must be avoided.

The ideal glasses, of course, are those of quartz, which combine all the advantages of the others, but are practically excluded from consideration on account of their high cost.—*Pharm. Ztg.*, lv (1910), No. 18, 181; from *Journ. de Pharm. et de Chim.*, 1910, Nos. 2 and 3.

Sterilized Gelatin Solution.—Preparation for Ampuls.—"E. S." gives a detailed description of the method of preparing sterilized gelatin solution for ampuls as practiced in the laboratory of K. J. Kresling, in St. Petersburg: Using only the best quality of gelatin, 100 Gm. are dissolved in 1000 Gm. of water by heat in a porcelain or enameled vessel. If the resulting solution is acid it must be neutralized with alkali. When cooled to 40°-45° C., the white of one egg, beaten with several times its volume of water, is added and the mixture is heated in a flask in a current of steam for 20 to 25 minutes, and then for 5 to 8 minutes, under pressure in the autoclave at 103°-105° C. This coagulates the albumen completely and the solution may now be filtered, which is best accomplished in the autoclave under a gentle current of steam. The clear filtrate is now adjusted to 1000 Gm. and, if the proper conditions have been observed, should form a consistent jelly on cooling. After adding 0.8 per cent. of

sodium chloride, the hot solution is at once filled into ampuls (25 and 50 Cc. capacity), previously carefully cleaned and perfectly sterilized, and avoiding that the solution touches the walls of the neck, which would result in discoloration of the sealed end of the ampul. In order to assure complete sterility, the filled ampuls are subjected for two days to a temperature of 37° C. in the thermostat, during which exposure no colonies should be developed. Pharm. Ztg., liv (1909), No. 56, 551; from Pharm. Jour. (Russ.) 1909, 200.

Liquor Aluminii Acetici—Formula Permitting the Sterilisation of the Product.—K. J. Sooms recommends the following formula, a method for preparing a solution of aluminum acetate which may be sterilized without decomposition: 30 p. of pure alumin. sulph. are dissolved in 75 p. of distilled water and 13 p. of calcium carbonate, triturated with 20 p. of distilled water, are added, rinsing in the last portion of calcium carbonate with 5 p. more of water. The mixture is stirred frequently during 24 hours and then heated until CO_2 is no longer evolved; then 36 p. of acetic acid, of 30 per cent., are added, and the preparation is finished as usual. The product when heated to boiling becomes slightly opalescent, but perfectly clear again on cooling.—Pharm. Ztg., liv (1909), No. 86, 851; from Baltische Pharm. Monatsch., 1909, 95.

Liquor Aluminii Acetici—Improved Manipulation.—Dr. Bulenheim points out that the usual method of preparing solution of aluminum acetate suffers from all the faults inherent to a saturated or supersaturated solution. Calcium carbonate and gypsum, held in solution by the carbonic acid evolved during the process of preparation, are gradually deposited and render the solution turbid. Employing ingredients of the right quality, the directions should be so changed that a more concentrated solution is preliminarily produced, stirring the mixture during the reaction until the evolution of gas is no longer perceptible. The mixture is then allowed to stand several days, so that the calcium salts may completely precipitate. If the solution is then filtered and diluted to the proper strength a perfectly stable preparation is obtained, colorless and permanently clear. Furthermore, the author points out that the variable quality of the aluminum sulphate of the market is responsible for the unsatisfactory quality of the solution. He therefore suggests that a

Liquor Aluminii Sulphurici be adopted in the G. P. of the strength 1 : 2 or 1 : 3, to be directed in place of the dry salt now official, which suffers from the fact that it contains water in variable proportions, whereas for the preparation of solution of aluminum acetate it should be anhydrous.—Pharm. Ztg., lv (1910), No. 32, 324.

Burow's Solution is the subject of an interesting paper by Otto Raubenheimer, in which he discusses the origin of this preparation, and its relation to the liquor aluminii acetici of the different authorities. The paper appears in the "Proceedings," 1909, 1036-1044.

Alkaline Antiseptic Solution—Bleaching and Spontaneous Restoration of Color.—Prof. H. V. Army mentions that some specimens of alkaline antiseptic solution made by different students of the Cleveland College of Pharmacy and stored in a cupboard during about six months were found very much faded, some being almost colorless. One of the bottles being opened, the color was completely restored within half an hour, and each of the bottles opened since have in like manner resumed their original color. The author is unable to account for this peculiar action.—Proc. Ohio State Pharm. Assoc., 1909, 40.

Liquor Antisepticus Alkalinus Ruber is the distinctive name given to a formula regarded as an improvement of that for the alkaline antiseptic solution now official in the N. F. The improved formula is given in the "Proceedings," 1909, 1137-1138.

Solution of Chlorinated Soda—Improved Process.—Having found the U. S. P. method for the preparation of solution of chlorinated soda inadequate to yield a solution containing about 6 per cent. available chlorine, Elias Elvove, in search of an available method, found the process of Graebe, which depends upon the direct action of chlorine on sodium hydroxide solution, to serve excellently, the chlorine being generated from the hydrochloric acid by reaction with a permanganate (in Proceedings, 1903, 824). Graebe found that by employing a slight excess of the alkaline solution the stability of the solution is much increased. Moreover, that the amount of chlorine produced by means of a given quantity of permanganate is quantitative. From the data so obtained, Mr. Elvove has developed the following process for a solution of chlorinated soda containing 6 per cent. of available chlorine: 27.3 Gm. of potassium permanganate are placed into a distilling flask of about 300 Cc. capacity, fitted with a bi-perforated stopper, one of the perforations for the reception of a separating-funnel containing 175 Cc. of strong (33 per cent.) hydrochloric acid, the other for the delivery tube of the generated chlorine. This tube is connected with a small wash-bottle containing about 50 Cc. of water, and the wash-bottle in turn delivers the gas into a narrow-mouthed measuring cylinder containing a solution of 50.75 Gm. of sodium hydroxide in 419.25 Gm. of water, and almost filling it. When all the connections are made, the stop-cock of the separating funnel is turned so as to let the hydrochloric acid fall slowly in drops on the solid potassium permanganate in the flask—this being, of course, easily regulated. When the current of chlorine is observed to slow down, heat is applied to the flask and continued until the gas only very slowly bubbles through the wash-bottle, when the receiving cylinder is disconnected and the process is ended. In the experiment, described in detail, the increase in weight of the alkaline solution was 29 Gm., indicating 5.81 per cent. of chlorine.—Amer. Journ. Pharm., April, 1910, 161-166.

Solution of Hydrogen Dioxide.—Presence of Chlorine.—In view of the omission of a test for chlorides and free chlorine in the proposed purity tests of the G. P. for solution of hydrogen dioxide, Dr. Langensiepen calls attention to his experience that this solution frequently contains large quantities of chlorides and so much free chlorine that its presence manifests itself by the odor. A proper and exact test for free chlorine should therefore be included in the official tests of the G. P. Apoth. Ztg., xxv (1910), No. 24, 201.

Liquor Picis Carbonis.—Otto Raubenheimer directs attention to the confusion existing in regard to this preparation, which is also (and more generally) known as "Liquor Carbonis Detergens," owing to the difference in alcoholic strength of the tincture of quillaja prescribed by different authorities. The paper is printed in the "Proceedings," 1909, 1031-1035.

Liquor Potassii Arsenitis has been examined by A. B. Lyons with the object of ascertaining the extent of the gradual oxidation to which this solution is subject under ordinary conditions. This paper appears in the "Proceedings," 1909, 904-905.

Solution of Sodium Arsenate, G. P.—Simple Method of Determining the Arsenic Acid.—Referring to and reviewing the various methods that have been proposed for determining the H_3AsO_4 content in the liq. natrii arsenici of the G. P., E. Lukenow recommends the following simplified method: 10 Cc. of the solution are pipetted into a glass-stoppered flask, 3 Gm. of potassium iodide and 20 Cc. of concentrated hydrochloric acid are added, mixed, and allowed to stand 10-15 minutes (not longer). The neck of the flask is then rinsed with about 20 Cc. of water, to wash down any adhering iodine liberated by the reaction, and the iodine is titrated in the usual manner with $\frac{N}{10}$ solution of thiosulphate, with or without the use of starch paste as indicator. The reaction is expressed by the equation: $H_3AsO_4 + 2HCl + 2KI = H_3AsO_3 + 2I + 2KCl + H_2O$. The solution containing 1 per cent. of anhydrous arsenate, 10 Cc. should require 10.7-10.8 Cc. of $\frac{N}{10}$ solution of thiosulphate, corresponding to a purity of 99.5-100 per cent.—Apoth. Ztg., xxv (1910), No. 15, 122.

Sodium Hypobromite Solution—Convenient Method of Preparation for Urea Determinations.—To obviate the inconvenience attending the use of sodium hypobromite as usually made, A. Job and Dr. Clarens suggest the use of sodium hypochlorite and potassium bromide. The latter, treated by the hypochlorite, is very rapidly converted into hypobromite, so that eau de Javelle added to potassium bromide reacts on urea exactly in the same way as the liquid prepared with sodium hydroxide and bromine. Eau de Javelle is very stable under proper conditions, while the solution of potassium bromide may be kept indefinitely. The quantities recommended are 1 Gm. of potassium bromide for 20 Cc. of eau de Javelle. The two are mixed five minutes before the estimation.—Pharm. Journ. and Pharmacist, Oct. 23, 1909, 507; from Journ. de Pharm. et Chim., Aug. 1, 1909, 100.

MUCILAGINES.

Mucilage of Acacia—Preservation by the Addition of 10 Per Cent. Alcohol.—"Dr. B. in D." regards alcohol as the best preservative for mucilage of acacia and does not consider its addition objectionable from a therapeutic standpoint, while pharmaceutically it presents certain advantages. The addition of 10 per cent. alcohol, it is true, occasions preliminarily a strong coagulum, which, however, disappears on shaking, or on standing. The author therefore suggests the adoption of the following formula in the G. P. :

"3 p. of acacia, washed with water, are dissolved in 6 p. of water and then shaken with 1 p. of alcohol until the coagulum produced is completely dissolved. Then strain."—Pharm. Ztg., lv (1910), No. 23, 232.

Mucilage of Acacia—Novel Method of Straining.—Of the many methods of straining mucilage of acacia that A. W. Bromley has tried, he finds the least troublesome that is practicable in an ordinary pharmacy is to force it through the muslin by the pressure produced by the expansion of air in the bottle. Dissolve a quantity in a wide-mouthed bottle so large that the gum and water only half fill it; when dissolved, remove the cork and cover the bottle-mouth with muslin very firmly tied, and stand the bottle in the coolest place available for half an hour or so. Then invert the bottle into a measure (or other suitable receiver) and put the whole in a warm place. The confined air within the bottle expanding will force out part of the mucilage. When the process stops, the bottle is again set upright in a cool place, and when quite cold inverted into the measure as before. The author does not consider the temperature of 80° or 90° F., to which the mucilage is exposed by this method, to affect it injuriously.—Pharm. Journ. and Pharmacist, July 3, 1909, 6-7.

Mucilage Salep.—Manipulation.—The ordinary method of preparing mucilage of salep presents difficulties to secure a product free from lumpy particles, which according to Dr. Bulenheim may be overcome by manipulation as follows: The finely powdered salep is sprinkled in small portions at a time on the surface of the total quantity of water directed, awaiting the complete immersion of the powder before stirring and adding the next portion. After all the powder has been added in this way, the mixture is heated with frequent stirring—the entire procedure requiring about 15 minutes. Pharm. Ztg., lv (1910), No. 33, 334.

OLEA.

Iodine Oils.—Method of Preparation.—Remo Conradt has experimented with various methods for the preparation of iodine oils and recommends the method of Winternitz as being most satisfactory if carried out as follows: The calculated quantity of freshly prepared iodine chloride (CII) is dissolved in absolute alcohol, mixed with the oil (almond or se-

same are the best) and heated to 40° , shaking frequently. The alcohol is then removed by the aid of a separatory funnel and the last portions are driven off in a vacuum at 40° C. The iodine oil so obtained is colorless and contains no free iodine. A 10–20 per cent iodine-sesame oil remains unchanged when heated to 100° – 110° C., while the 25 per cent. oil is not changed at 100° C., but assumes color at 105° – 110° C. Pharm. Ztg., liv (1909), No. 97, 957; from Boll. Chim. Farm., 1909, No. 48.

Phosphorated Oil—Conditions Affecting Stability.—P. Bohrisch finds that light, air and moisture have an unfavorable influence on the stability of phosphorated oil, while rancidity and temperature have comparatively little effect. Expressed oil of almond is preferable to all other fixed oils for the preparation of phosphorated oil, because of its purity and practical freedom from moisture, although a carefully prepared olive oil will also answer well. The stability of the stronger phosphorated oils (1:100 or 1:200) is, however, quite limited. They may keep unchanged for several months if preserved in full, carefully stoppered vials in a dark place, but acquire prolonged stability by the addition of certain deoxidizing agents, such as limonene or other terpenes (1 per cent.), or of ether or alcohol (5 per cent.). The more dilute forms of phosphorated oils (1:500 or 1:1000), on the other hand, possess considerable stability, keeping well for half a year or more, even if the stopper is frequently lifted during that period; but both the strong and the more dilute oils will retain their phosphorus content unchanged for at least nine months, and even a year, if the preservative additions are made as above indicated. The most satisfactory stronger oil, however, from which suitable dilutions may be made is obtained if paraffin oil is used in place of the vegetable oil, and adding to this 5 per cent. of ether as preservative. The most suitable strength for this is 1:200. The author gives explicit directions for preparing the oil,* which may be consulted in Pharm. Ztg., liv (1909), No. 87, 859–860.

Phosphorated Oil—Formula of the Hungarian Pharmacopœia.—In connection with the observations of Mr. Bohrisch, the following formula of the Hungarian Pharmacopœia is of interest: 94.5 ol. amygdal. dulc. and 10.0 natrium sulfuricum dilapsum are heated together for half an hour on the water-bath, with frequent and vigorous shaking; then 0.5 dry phosphorus is added and, excluding light, shaken until the luminosity of the phosphorus ceases. Finally 5.0 alcohol (95 per cent.) are added. If 1 Gm. of phosphorated oil so prepared is shaken with 10 Cc. of 5 per-cent. copper sulphate solution, a dark brown emulsion is formed, which, after frequent shaking, becomes colorless.—Pharm. Ztg., liv (1909), No. 97, 956.

* Mr. Bohrisch's results and observations, except as to details, are practically identical with those described by Hugo Korte in 1908, which see in Proceedings 1909, 92.—Rep.

Lecithin-Guaiacol Injection—Formula.—R. Lethert recommends the following formula and manipulation for preparing a lecithin-guaiacol injection: About 12.0 Gm. of the best olive oil are heated with 6.0 Gm. of 95 per cent. alcohol on the water-bath until all the alcohol, and with it any water present in the oil, is evaporated. When cooled to about 40° C., 2.0 Gm. of this washed and dried oil are triturated in a clean warm mortar with 1.0 Gm. each of lecithin (pur. Merck), and guaiacol (absol.), avoiding strong frothing as much as possible, and sufficient more of the oil is then added gradually until a total of 7.0 to 8.0 Gm. has been used. The solution is then strained into a clean and dry sterilized vial through a gauze filter, and sufficient more oil is passed through the gauze to make exactly 10.0 Gm. of solution. If the lecithin is perfectly fresh a clear solution is thus readily obtained; otherwise, Swedish filter-paper must be used in place of the gauze filter. The solution must not be violently shaken at any time to avoid frothing.—Pharm. Ztg., liv (1909), No. 87, 859.

OLEATA.

Hydrargyrum Oleatum, B. P. 1898—Question of Percentage.—J. Hatfield Dyson observes that the preparation of a 25 per-cent. (oxide) mercury oleate by the method of the 1885 Pharmacopœia presents no serious difficulty, but the percentage question (of the oleate B. P. 1898? Rep.) is a stumbling block to some if, for example, unguentum hydrargyri oleatis, 5 per cent., is prescribed. This may be interpreted to mean 5 per cent. of mercuric oxide by some, or 5 per cent. of mercuric oleate by others.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 700.

Zinc Oleate and Zinc Stearate—Improved Formulas.—E. Fullerton Cook and P. C. Dosch, owing to the indiscriminate use of the titles, zinc oleate and zinc stearate, set forth some facts about these preparations and give experimental data with the object of establishing greater uniformity in their formulas, which they recommend to be as follows:

Zinci Oleas—Zinc Oleate.

Zinc sulphate.....	47 Gm.
Soap (Castile), dry and powdered (or grated)	100 Gm.
Distilled water, a sufficient quantity.	

Dissolve the zinc sulphate in 2500 Cc. of distilled water and filter if necessary. Dissolve the soap in 1500 Cc. of hot distilled water and strain the solution through cotton. Warm both solutions to about 50° C. (122° F.) and pour the solution of the zinc salt slowly into the soap solution, constantly stirring. Collect the precipitate on a muslin strainer, wash it thoroughly with distilled water, and allow it to dry on the strainer, or on clean paper, protected from dust and without exposure to heat. Finally pass the mass through a fine sieve.

Zinci Stearas—Zinc Stearate.

Ammonia water (10 per cent.).....	50.2 Gm.
Stearic acid	88.5 Gm.
Zinc sulphate.....	44.8 Gm.

Triturate the stearic acid with the ammonia water in a mortar to a smooth paste, adding additional ammonia water, if necessary, until a slight excess is present. Mix this pasty mass with 4000 Cc. of distilled water, and heat it until a solution results. Dissolve the zinc sulphate in 2500 Cc. of distilled water, warm both solutions to about 50° C. (122° F.) and then pour the solution of the zinc salt slowly into the solution of ammonium stearate, stirring constantly. Collect the precipitate on a strainer, wash it thoroughly with distilled water and dry it without exposure to dust or heat. Finally pass it through a fine sieve. The yield is about 100 Gm.

As zinc stearate is largely and chiefly used as a dusting powder, care should be taken throughout the process, so that the product is practically sterile. The authors describe a second process, in which monohydrated sodium carbonate and zinc acetate are directed in place of ammonia water and zinc sulphate, but they prefer the one described because the latter are more likely to be found in every stock in sufficient quantities.—Proceed. Penna. Pharm. Assoc., 1909, 340-343.

Zinc Oleate—Modification of Process of Preparation.—In view of the idea that oleate of zinc varies in composition according to the method of preparation, W. B. Cowie prepared a sample from good hard soap and zinc sulphate in strict accordance with the official directions, and another from the same materials and by the same method, except that it was heated sufficiently to melt the oleate, which was well mixed with the hot water and then allowed to cool; this was repeated until it was free from sulphates. Each sample was examined, and the results are:

	Moisture.	Fatty Acids.	Melting-points of Fatty Acids.	Zinc.
Sample 1 (strictly B. P.)	4.3 per cent.	87.5 per cent.	27°-28° C.	9.2 per cent.
Sample 2 (melted)	3.6 per cent.	86.8 per cent.	26°-27° C.	9.1 per cent.

The results vary but slightly, the one made at the higher temperature containing 0.7 per cent. less fatty acids and 0.1 per cent. less zinc, and for a substance of this nature the difference is negligible. Mr. Cowie therefore recommends the second method when the oleate is to be used solely for ointment, as much time is saved in collecting and drying; but that made by the first method is vastly superior for the powder form, as it is readily friable and easily mixed with other powders.—Chem. & Drugg., Dec. 25, 1909, 968.

Zinc Oleate, B. P.—A Practical Suggestion.—W. B. Cowie has prepared oleate of zinc from good hard soap and zinc sulphate in strict accordance

with the official directions (B. P.), and another sample from the same material, deviating from the official directions however by heating sufficiently to melt the oleate, which was well mixed with hot water and then allowed to cool, and this repeated until it was free from sulphates. The results of examination of the two samples show them to vary so slightly in their composition, that the difference is negligible. The second method is so much more convenient and expeditious than the official one, that it is recommended by the author when the oleate is to be used solely for ointment; but that made by the official method is vastly superior for the powder form, as it is readily friable and easily mixed with other powders.—*Pharm. Journ. and Pharmacist*, Jan. 8, 1910, 24.

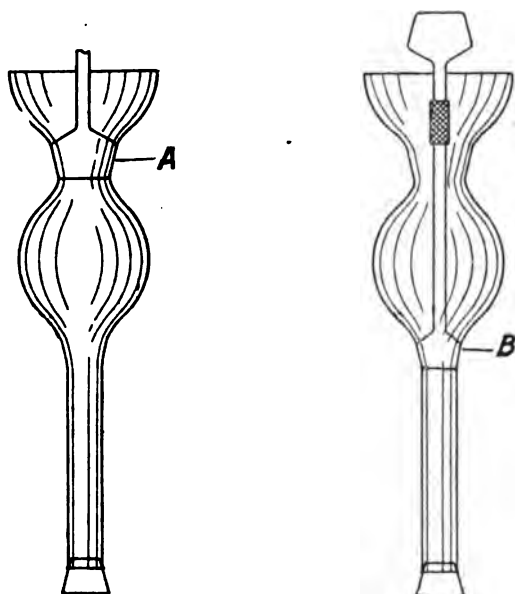
Zinc Stearate—Commercial Variation.—Of four samples of zinc stearate examined by C. E. Hoffman, two on ignition left a residue of 15.5 per cent., one 11.4 per cent., and one 9 per cent. The stearic acid liberated from the third sample had a m. p. of 60° C.; that from the fourth sample was yellow and melted at 72° C. A sample made with zinc acetate and soap met the U. S. P. requirements.—*Amer. Journ. Pharm.*, May, 1910, 243.

PULVERES.

Plant Powders—Convenient Method of Determining Mineral Impurities.—Rackwitz directs attention to a convenient method for expeditiously determining sand and other mineral impurities in vegetable powders, which has been in use with advantage in agricultural experiment stations. It depends on the facility with which the vegetable matter, being specifically lighter, will float on the surface of chloroform (or concentrated zinc sulphate solution), while the heavier mineral matter (sand, etc.) rapidly settles to the bottom. The experiment is made by the aid of the "sediment funnel," shown by the accompanying cut (Fig. 60), which consists of a small, pear-shaped vessel with a cup-shaped expansion above, and a narrow, elongated neck beneath, the lower orifice of which is closed by a stopper or by means of a rubber tube and clamp. It is fitted also with a ground-glass stopper (*b*) with a long stem, which shuts off the neck from the pear-shaped bulb, while the cup-shaped orifice may be closed by the larger, short-stemmed ground-glass stopper (*a*)—these positions being shown in the drawing. In use, the pear-shaped bulb is filled with chloroform to about half its capacity, a weighed quantity of the powder under examination is introduced and, the stopper (*a*) being inserted, the contents are mixed and the funnel set aside. In a short time the mineral matter will have completely subsided into the neck; the stopper (*a*) is removed, the smaller stopper (*b*) is inserted, and the contents of the narrow neck are allowed to flow into a tared platinum capsule by removing the stopper at the lower extremity or opening the clamp on the rubber tube if such be used. The chloroform is decanted from the sediment so collected, the re-

sidual matter is dried, the capsule heated to final redness, and, after cooling, weighed.—Pharm. Ztg., liv (1909), No. 56, 551.

FIG. 60.



Sediment Funnels.

Commercial Powdered Asafetida—Deplorable Condition and its Cause.—Azor Thurston has examined a number of commercial samples of powdered asafetida procured from retailers and jobbers, and gives the results as follows :

No.	Ash.	Alcohol, soluble.
1	80.05	7.68
2	79.23	12.25
3	27.14 ..	51.65
4	33.92	41.35
5	18.38	19.54
6	20.54	42.46
7	39.53	45.25

He addressed a number of drug millers for an explanation of this deplorable condition, and among the replies received the following will probably best explain the cause :

“To convert the gum into powdered form requires manipulation consistent with the condition of the gum as we receive it. There are no two cases of gum the same. There is not enough asafetida tears obtainable in

foreign countries or this country to supply one-hundredth part of the demand for powdered asafetida. We mean to explain that the powdering of the tears for commercial demands is out of the question. We separate the hard gum from the soft gum. The hard we powder; the soft we sell in the whole state, but it is very seldom the gum is hard enough to convert into powdered form in its natural condition, and after it is in powdered form it is assayed and we sell it on the assay to the manufacturer, who conducts the manufacture of the article, in keeping with the assay, in preparing a preparation equal to the requirements of the U. S. P."—Proceedings Ohio State Pharm. Assoc., 1909, 50-51.

"Powdered" Castor Oil.—Preparation with Magnesia.—Otto B. May states that by admixture with magnesia castor oil may be reduced to a powdery form containing 50 per cent of the oil in an unchanged condition. The powder is stable, odorless, readily taken, and well borne, while its therapeutic efficacy is as great as the same dose of pure castor oil—the magnesia contributing its own properties to the powder. While the use of magnesia as an excipient to convert liquids into dry or semi-dry substances is not new, in all other cases the magnesia combines chemically with the substances with which it is mixed; but in the case of castor oil powder the oil is in no way changed, and on extracting the castor oil with ether in a Soxhlet apparatus from 90 to 98 per cent of the entire fat content may be recovered—the remainder being recovered if the powder is acidified with enough diluted hydrochloric acid and the aqueous mixture is shaken out with ether. The only effect of the magnesia therefore is to form a minute quantity of magnesia soap with the free fatty acids present in the oil, which after this treatment shows an acid value of zero. The method may doubtless be applied to other oils. Pharm. Journ. and Pharmacist, Aug. 28, 1909, 296; from Jour. Soc. Chem. Industry.

Compound Powder of Pepsin.—Improved Formula.—George M. Beringer gives reasons which justify his conclusion that this preparation should be retained in the National Formulary, but recommends that the present Latin sub-title, "Pulvis Digestivus," be eliminated. Furthermore, the quantity of pepsin in the present formula is but 15 per cent. of saccharated pepsin, equivalent to but 1.5 per cent. of pepsin U. S. P., a quantity *too small* to obtain satisfactory digestive activity or possibly to comply with the regulations of the Food and Drugs Act. It is proposed to increase this to 15 per cent. of pepsin so as to maintain its proportion equivalent to the pancreatin directed.

As the compound powder of pepsin is largely dispensed in powders, and so becomes subjected to atmospheric exposure, it is recommended that in this preparation the least hygroscopic form of pepsin be used, and it is proposed that the so-called "insoluble" powdered pepsin, of the official digestive value, be directed in its preparation, thus increasing its permanency and stability.

The text of this modified formula would read :

Pulvis Pepsini Compositus. (Compound Powder of Pepsin.)

Powdered pepsin (so-called "insoluble" variety).....	15 Gm.
Pancreatin	15 Gm.
Diastase	1 Gm.
Lactic acid.....	1 Cc.
Hydrochloric acid.....	2 Cc.
Sugar of milk, a sufficient quantity to obtain 100 Gm. of finished product.	

Add the acids gradually to 60 Gm. of sugar of milk and triturate until they are thoroughly mixed. Mix the pepsin, pancreatin and diastase, and incorporate this with the acidified sugar of milk. Weigh, and add sufficient sugar of milk to make the weight 100 Gm. Triturate the mixture thoroughly, and finally rub through a hair sieve and preserve the powder in well-stoppered bottles.—*Amer. Journ. Pharm.*, July, 1909, 331-336.

Granular Effervescent Potassium Citrate.—Improved Formula.—Robert C. White suggests an improvement in the formula for effervescent potassium citrate which depends entirely on a change in the acids. He finds that an excellent preparation may be made by reversing the amounts of the acids thus making the formula read :

Potassium citrate	200 Gm.
Sodium bicarbonate, dried and powdered.....	477 Gm.
Citric acid, uneffloresced crystals	252 Gm.
Tartaric acid, dried and powdered.....	162 Gm.

The advantages gained, by using this formula, other than that the salts are readily soluble in water are : (1) the solution of the salt is very pleasant to the taste ; (2) the physical appearance is greatly improved, due to the fact that the slightly increased amount of water of crystallization present causes the powder more readily to acquire the proper consistence when subjected to heat ; and (3) by quick manipulation an increased amount of carbon dioxide is retained in the finished preparation. *Drugg. Circ.* Dec., 1909, 621.

RESINÆ.

Resin of Podophyllum is the subject of an interesting paper by Wilbur L. Scoville in which he reviews the investigation concerning the resins obtainable from the American species of *podophyllum*—*P. peltatum*—and from the Himalayan species *P. emodi*—that have appeared in the literature since Dymock and Hooper (1889) called attention to the latter species as a possible source of resin of podophyllum. The paper appears in the "Proceedings," 1909, 897-901.

Podophyllum Resin.—Adulteration with aloes.—Joseph H. Williams has recently examined a sample of podophyllum resin which, although coming

within the limits of the B. P. and B. P. C. tests, was proven to contain 25 per cent. of aloes. A trial sample made by mixing 1 part of powdered socotrine aloes and 3 parts of genuine podophyllum resin corresponded to the sample under examination. Pharm. Journ. and Pharmacist, May 14, 1910, 608.

SAPONES.

Sapo Cresolis, B. P. C.—*Modification of Formula.*—Accommodating the formula for Sapo Cresolis, B. P. C., to Australian conditions, Professor R. C. Cowley, of the Brisbane College of Pharmacy, proposes the following modification :

Olive oil, by weight.....	20.00
Caustic potash	5.75
Water	5.00
Alcohol (S. V. M.), by weight	10.00
Cresylic acid, by weight	50.00

Dissolve the caustic potash in the water and alcohol, and heat the solution with the olive oil until saponification is complete and a clear liquid is obtained, then add the cresylic acid. The product is a clear saponaceous liquid, quite soluble in water and neutral to phenolphthalein. The cresylic acid should not have been exposed unduly to air, as this not only causes the acid to darken in color, but causes a certain amount of resinification in the climate of Queensland.—Pharm. Journ. and Pharmacist, Aug. 7, 1909, 202.

Liquid Soaps—Formulas.—Dr. Ernst Richter recommends the following formulas for preparing various soap solutions from different oils :

Sapo Liquidus Glycerinatus.—Heat 4.5 Kgm. of olive oil in a capacious enameled dish on a steam bath to 90° C., and 1.65 Kgm. of solution of KOH (47° B.) in a small enameled dish to 80° C., turn off the steam, add 3.85 Kgm. of alcohol to the oil, then the KOH solution, and mix energetically until saponification is completed, which requires about two minutes. The soap so produced is immediately dissolved in a mixture of 1.5 Kgm. glycerin and 12.5 Kgm. distilled water and filtered after cooling. Solution of KOH, of 47° B., prepared by electrolysis on a large scale, is obtainable on the (German) market, and very much cheaper than if prepared from fused KOH.

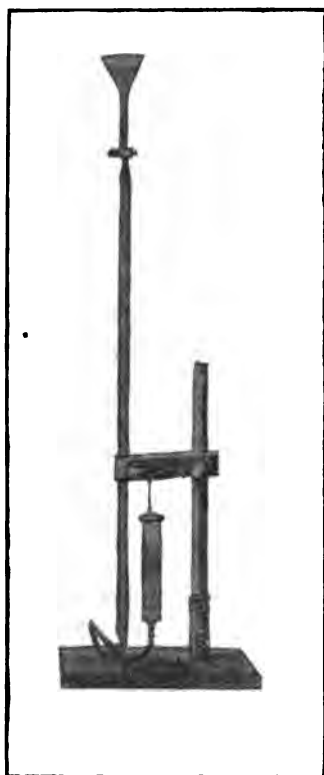
Spiritus Saponatus e Sinapolo.—This is prepared by saponifying 2250.0 Gm. of fixed oil of mustard with 1875.0 Gm. of alcohol and 825.0 Gm. of solution of KOH (47° B.) in the same way as in the preceding formula, then dissolving the soap produced in 9375.0 Gm. of alcohol and 8175.0 Gm. of distilled water, and filtering after cooling.

Spiritus saponatus kalinus gossypatus is obtained by saponifying 909.0 Gm. of cotton oil with 757.0 Gm. of alcohol and 328.0 Gm. of solution of

KOH (47° B.), as in the previous formulas, dissolving the soap in 1219.0 Gm. of alcohol and 732.0 Gm. of distilled water, filtering after cooling, and perfuming with 55.0 Gm. mixt. oleosa balsamica or any other desirable perfume.—Apoth. Ztg., xxv (1910), No. 20, 168.

Spiritus Saponatus, G.P.IV—Improved Process.—Schnabel recommends the use of freshly prepared and more concentrated solution of alkali for preparing spiritus saponatus, and suggests the following improved formula for admission into the G. P.: Olive oil, 60, and alcohol, 75, are placed in

FIG. 61.



Nitrometer.

a flask, and this into warm water or on a hot surface. Potassium hydroxide, 10.5, is dissolved in water, 19.5, and the warm solution is at once added to the oil mixture, which is then shaken until clear, or at intervals while the flask stands in a warm place. Then alcohol, 225, and water, 210, are added, and the mixture, after standing several days, is filtered.

Spiritus Saponatus Camphoratus is prepared under similar modification. Apoth. Ztg., xxv (1910), No. 23, 210.

SPIRITUS.

Spirit of Nitrous Ether—Improved Nitrometer.—John Watson constructs an efficient nitrometer from an ordinary burette, with glass cock, a short length (about 1 foot) of rubber "infant-feeder" tubing, a perforated cork bearing a short piece of glass tubing, the barrel of a one-ounce glass syringe, and a small glass funnel. The apparatus as constructed is shown by the accompanying photograph (Fig. 61), in which the leveling tube (the syringe barrel) is attached to the burette stand by a piece of twisted wire in order that it may be conveniently shown. The burette, with the small funnel attached to the tap end, is inverted and the leveling tube attached to the large opening below by means of the cork and rubber tubing. It is then filled with brine in the usual manner, care being taken to fill it up so that some comes through the tap and fills up any small interstices between the funnel and the pointed end of the burette. The spirit, H_2SO_4 , and KI solution are then consecutively added and after the evolution of gas is completed the leveling tube is adjusted to the proper height and the volume of gas read of.—Pharm. Journ. and Pharmacist, March 26, 1910, 389.

Spirit of Nitrous Ether, B. P.—Complex Constitution.—Having occasion to estimate the alcoholic strength of *concentrated* spirit of nitrous ether (1-7) for excise purposes, and no method being at hand, Harold R. Jensen found it necessary to devise one, which consisted in "salting out" the ether by means of a concentrated solution of calcium chloride (50 Gm. CaCl_2 in 50 Cc. water) in the cold, and estimating the alcohol in the saline solution, by dilution and distillation, in the usual manner, after having satisfied himself that no ethyl nitrate was retained by it. In this way he determined an alcoholic strength of 81.6 per cent. An examination of the "salted-out" ester layer, however, revealed the fact that this measured 8 Cc. whereas from the quantity of concentrated spirit taken (25 Cc.) this should have measured only 4.7 Cc. since by the nitrometric test its spirit was shown to contain 20 per cent. of ethyl nitrite. The author suggests that the increased volume of ester may be accounted for by a more complex constitution of the esters produced by the reaction, and that the ethyl nitrite is possibly combined with some other compound. There is some evidence of a $\text{CH}_3\text{CHO}-\text{C}_2\text{H}_5\text{NO}_2$ compound, and it is even possible that an ethyl nitrite-alcohol compound exists, analogous to the ethyl acetate-alcohol compound recently indicated by Habermann and Brezina. Pharm. Journ. and Pharmacist, May 14, 1910, 606.

Spiritus Aetheris Nitrosi, B. P.—Experimental Preparation.—Abel Scholar recommends the following details of a method for preparing spirit of nitrous ether in conformity with the B. P. as being particularly suitable as an experiment for students: Place into a 10-oz. bottle 50 Cc. of 90 per cent. alcohol. Add thereto gradually, owing to the rise of temperature,

5 Cc. of sulphuric acid (sp. gr. 1.843). When cool add 50 Cc. more alcohol to which has been added gradually 7.5 Cc. of nitric acid (sp. gr. 1.42), and, lastly, 50 Cc. more alcohol. Lightly cork the bottle and leave overnight. Then distil the liquid, using a saucepan containing warm water, a flask with a side tube containing 5 Gm. of copper turnings, and fitted with a thermometer in the usual way, the flask being attached to an efficient condenser. The 135 Cc. of distillate represents the finished product. The temperature of the flask, with ordinary care, does not rise higher than 77° to 78° C. The action is uniformly moderate, and there is not the least evaporation of the more volatile constituent. The distillate is received in a 200 Cc. graduated cylinder plugged with a ball of cotton.—Chem. & Drugg., Aug. 14, 1909, 292.

Spirit of Nitrous Ether—Deficiencies in Ester Content of Commercial Samples.—Prof. L. E. Sayre, Director of Drug Analysis, Kansas State Board of Health, says in a recent report that the deficiencies frequently observed in the ester-content of commercial samples of spirit of nitrous ether is evidently due to the neglect of conforming to the directions of the U. S. P. for its proper preservation. It is not infrequently the practice to keep this spirit in half-gallon or gallon bottles, exposed more or less directly to the sun's rays, whereas if kept in small amber-colored bottles, exposed at most to diffused daylight, comparatively little deterioration occurs. But even here, much depends on certain apparently trivial conditions. Thus, in practice, he has found that if preserved in glass-stoppered bottles, even though these are of amber-glass, the spirit deteriorates much more rapidly than it does in the same bottles if they are stoppered with a good, sound cork. Another practice, which he regards most reprehensible, is that of keeping it in stock in small bottles ready for sale, and particularly such trade packages as are usually supplied to and by grocers. These almost invariably prove perfectly worthless, and should not be permitted on the market.—Pharm. Era, Nov., 11, 1909, 500.

Spirit of Camphor—Estimation of Camphor by "Salting Out."—After reviewing the various methods, official and otherwise, proposed for the estimation of the camphor content of spirit of camphor, Ernst Deussen proposes the following, which he finds free from the faults pointed out to him, and permits the direct weighing of the camphor obtained by a "salting out" process, similar to that used for the estimation of volatile oils in aqueous solutions: Five Gm. of the spirit is weighed into a 50 Cc. Erlenmeyer flask, 20 Gm. of a cold saturated aqueous solution of ammonium sulphate is added and then 30 Gm. of water, rotating the flask. The flask is closed with a cork, shaken to break up the separated camphor, and placed for about twelve hours in a refrigerator. The liquid is then filtered through a smooth filter of 7 Cm. diameter, and the camphor washed with 70 to 90 Gm. of water, so as to collect the camphor at the point of the cone. The wash water is tested for sulphate with barium chloride acidu-

lated with hydrochloric acid, stopping the washing when turbidity appears only after two seconds. The camphor is now pressed on the top with a bent spatula so as to form a cone. The filter is now covered with a watch glass and set aside, while a card, the size of a post card, is weighed together with a suitable watch glass. The camphor is now spread on a porous tile with a nickel spatula in a moderately thin layer. This is allowed to stand for one minute—covered with a watch glass of 10 to 12 Cm. diameter—when it is collected on the tared card, covered with the tared watch glass, and weighed at once. The accuracy of the method is experimentally demonstrated.

The saturated solution of ammonium sulphate is prepared by heating ammonium sulphate in a glass flask in a water-bath for 30 minutes with insufficient distilled water to dissolve the salt after frequent shaking. After cooling and standing 6 to 10 hours the clear solution is decanted, and ready for use. 100 p. of water at 100° C. dissolve 97.5 p. $(\text{NH}_4)_2\text{SO}_4$. Arch. d. Pharm., 247 (1909), No. 4, 307-312.

Spirit of Camphor.—Use of Oil of Turpentine as a Test.—Meurin proposes to utilize the difference in the solubility of oil of turpentine in alcohol of different strengths for determining the quality of Spirit of Camphor. Pure turpentine oil is soluble in all proportions in absolute alcohol, but proportionally less as the alcohol becomes weaker, so that 100 Gm. of 90 per cent. alcohol will dissolve only 23 Cc. of the oil at 15° C. The solvent action of the alcohol on the oil is, however, increased by the presence of camphor, so that 100 Gm. of 10 per cent Spirit of Camphor prepared with 90 per cent. alcohol will dissolve 33 Cc. of rectified oil of turpentine. To carry out the test, 20 Gm. of Spirit of Camphor are mixed with 6 Cc. of rectified oil of turpentine. If a clear solution results, and the Spirit of Camphor shows the specific gravity 0.845, it is assumed that the Spirit of Camphor has been prepared by the formula of the Pharmacopœia (Codex). Pharm. Ztg., liv (1909), No. 74, 727; from Rép. de Pharm. 1909.

SUCCI.

Lemon Juice.—Preservation and Storage.—According to the experience of Wilhelm Leske, lemon juice, carefully prepared from sound fruit gathered from November to March, should contain from 6 to 6½ per cent. of acid, keeps well in *wood* for an entire year, retaining its taste, flavor and color unimpaired if stored in a cool place, and is preserved, either with carbon dioxide under pressure, or by the addition of 0.3 per cent. of formic acid, of 0.05 per cent. of salicylic acid, or of 10 per cent. of alcohol. If the lemon juice is stored in *glass* and is to be sold and used quickly, formic or salicylic acids may be used as preservatives; but if it is to be kept for a longer time, the kind preserved with alcohol (or alcohol and sugar each 8 per cent.) should be selected. When large quantities

are in question, irrespective of the method of preservation, the juice should invariably be stored in wood, the barrels filled to the bung, and if a portion is withdrawn from the container the empty space should be well sulphured. When bottled for sale, the bottles should be corked air-tight; but by prolonged storage in glass the juice invariably acquires an empyreumatic taste and a darker color.—Pharm. Ztg., lv (1910), No. 19, 191.

Lime Juice—Test for Sulphurous Acid.—Having obtained a positive reaction for the presence of sulphurous acid by the official test in lime juice which had been received under a guarantee of purity, Edwin Dowzard examined some lime juice expressed from fresh fruits and obtained the same positive reaction (brown stain on lead paper). Following up his investigation, he finds that this reaction is due to the presence of the small quantity of volatile oil present in the expressed juice, this rendering the official test for sulphurous acid useless in the case of lime juice. Mr. Dowzard finds, moreover, that the expressed juice of fresh lemons acts in a similar manner but not so pronouncedly as pure lime juice. By further experiments he worked out a reliable method which is available both for the qualitative and quantitative estimation of sulphurous acid. The qualitative test, which will detect 1 part of SO_2 in 100,000 parts of lime juice, is carried out as follows: One hundred Cc. of lime juice is acidified with 5 Cc. of 20 per cent. phosphoric acid, and 50 Cc. distilled into 25 Cc. of a 1 per cent. solution of sodium bicarbonate contained in a Fresenius or other absorption flask; the latter is attached to the end of a condenser by a perforated cork. The distillate is placed in a 200 Cc. Erlenmeyer flask, a few pieces of zinc and 8 Cc. of hydrochloric acid added, a plug of cotton wool is inserted in the neck of the flask, and the mouth of the latter capped with lead acetate paper. After 30 minutes the paper is examined, when, if any SO_2 is present, it will be found stained dark brown or black, whereas if the juice is pure the paper remains unaffected.—Amer. Journ. Pharm., Dec., 1909, 561-564.

SUPPOSITORIES.

Suppositories—A Simple Suggestion.—J. Atlee Dean suggests to make suppositories by massing the ingredients in a mortar until plastic, rolling the mass into a cylinder, dividing this into the necessary number of segments and then pressing each segment into the ordinary suppository mold. This suppository combines all the advantages of the hand-made and molded article, and the manipulation is simple and expeditious.—Bull. Pharm., Oct., 1909, 429.

A Suppository Base, composed of cacao butter containing 10 per cent. of castor oil and $2\frac{1}{2}$ per cent. of white wax, is recommended by H. A. B. Dunning for summer use, and when a large per cent. of solid extracts are dispensed, in "Proceedings," 1909, 1142-1144.

SYRUP.

Syrups of the U. S. P. and N. F.—Suggestions of Improvement and Correction of Formulas.—During the past year George M. Beringer and George M. Beringer, Jr., have been engaged upon a series of experiments upon some of the official syrups, and while their work on several is not yet completed, they deemed it advisable to present and record a number of the results obtained. These investigations were undertaken with several points in view: 1. To critically examine the formulas now official and the products of the same. 2. To see if these could not be simplified and improved upon and formulas established by which the pharmacist can prepare all of his syrups in his own store, preferably direct from the drugs, without being dependent on the manufacturer. 3. To determine if the use of fluidextracts in the preparation of syrups cannot be eliminated. 4. To determine the availability of glycerin and water as menstruum for the extraction of the drugs and thus avoid the use of alcohol, the feasibility of which has already in part been demonstrated in the course of experiments upon the fluidglycerates (see "Proceedings," 1908, 981). Referring to the original paper of the authors for the details and results of their investigation, the titles of the preparations considered in their present communication may here find place as follows:

Syrupus aurantii, U. S. P.; syrupus aurantii florum, U. S. P.; syrupus ipecacuanhæ, U. S. P.; syrupus krammeriæ, U. S. P.; syrupus lactucarii, U. S. P.; syrupus pruni virginianæ, U. S. P.; syrupus rhei, U. S. P.; syrupus rosæ, U. S. P.; syrupus rubi, U. S. P.; syrupus sarsaparillæ comp. U. S. P.; syrupus scillæ comp., U. S. P.; syrupus senegæ, U. S. P.; syrupus glycyrrhizæ, N. F.; syrupus papaveris, N. F.; syrupus pini strobi comp. N. F.; syrupus quinidinæ, N. F.; syrupus rhamni catharticæ, N. F. The following improved formulas may serve as examples:

Improved Syrup of Ipecac.—Percolate 70 Gm. of powdered ipecac with a mixture of 100 Cc. of glycerin, 10 Cc. of acetic acid, and 290 Cc. of water, following with water until 600 Cc. of percolate is obtained. In this dissolve 750 Gm. of sugar, and add sufficient water to make the product measure 1000 Cc.

Improved Syrup of Lactucarium.—Beat up 50 Gm. of lactucarium with 400 Gm. of clean sand or 200 Gm. of pumice to coarse powder and place in percolator, shaking down evenly but not packing, pour on sufficient of a mixture of 250 Cc. of glycerin, 100 Cc. of stronger orange flower water, and 300 Cc. of distilled water to saturate and leave a layer above. Then cork up the percolator and cover, and macerate for two days. Then percolate slowly, using the remainder of the mixture and then distilled water until 700 Cc. of percolate is obtained; in this dissolve 600 Gm. of sugar, using a water-bath heat if necessary, and strain, making up the product to 1000 Cc. with distilled water.—Proc. N. J. Pharm. Assoc. 1909, 88-101.

Some U. S. P. Syrups made from Fluidextracts, which in a previous paper (Proceedings 1908, 951) had been reported as being unsatisfactory pharmaceutically, are again referred to in a paper by E. Fullerton Cook, who proposes modifications of the official formulas in accordance with his observations in "Proceedings," 1909, 1004-1009.

Fruit Syrups—Precautions Identical Whether Made with Preservatives or Without.—W. F. Anderson, representing a large fruit syrup manufacturing firm, says the precautions which are necessary in using fruits and syrups prepared without preservatives are no different than those which should be observed in using goods that contain a preservative. In the first place, it is always better to use a heavy simple syrup in diluting such goods for use. The best simple syrup for this purpose is made by dissolving 14 pounds of pure cane sugar (no blue preferred) in each gallon of water. Heat the water until it boils, then turn off the heat and add the sugar. Boiling the water makes it sterile, and, in turn, sterilizes the sugar if immediately added after removal from the fire. There is no real economy in using less sugar, as is often done, and at most a saving of a few cents per gallon. Scrupulous cleanliness is a *sine qua non*. They should be well rinsed with hot water each time they are emptied, and only so much of the syrup or fruit mixed at a time as will be rapidly used up. Moreover, when an original container is opened, its contents should be completely used before opening another. Of course, the syrups and fruits should be kept refrigerated as completely as is practicable, and not needlessly exposed. While these precautions may seem a trifle troublesome, in actual practice they will be found no real bother, and they are certainly no more exacting than most of us require in handling fruits in our homes. Mr. Anderson cites the case of a patron who had questioned the practicability of dispensing fruits and syrups prepared without preservatives, and who, after a number of failures apparently confirming his original opinion, had become an ardent convert when the cause of his failure was practically demonstrated by his neglect to observe rules which should have been applied with equal solicitude to the preserved goods formerly used.—Pharm. Era, July 8, 1909, 32-33.

Fruit Syrups—Recommendations for Their Preparation for the Soda Fountain Without Preservatives.—H. E. Barnard, State Food and Drug Commissioner of Indiana, summarizes his conclusions reached after a comprehensive study of the subject of preparing and preserving fruits and fruit syrups for the soda fountain, as follows :

1. Crushed fruits either purchased in glass or tin or prepared by the dispenser after proper formulas will keep without fermentation a sufficient length of time to allow of their disposal.
2. Fruit syrups properly prepared need no preservative other than sugar syrup to hold them until they are used up.
3. The keeping quality of crushed fruits and fruit syrups depends largely upon the strength of sugar solution employed in diluting the concentrates.

4. The heavier the sugar solution the more satisfactory it is. A solution made by dissolving fourteen pounds of sugar in a gallon of water is sufficiently heavy for all practical purposes and in most instances a ten-pound syrup is sufficiently heavy.

5. Goods kept at a temperature not exceeding 55 degrees Fahrenheit will keep indefinitely.

6. Goods when exposed at room temperature during the day and placed in the refrigerator at night will not ferment under seven days, even when made up with a ten-pound sugar solution.

7. Goods kept in jars provided for that purpose in the modern fountain will keep ten days or more without change, even when made up with a ten-pound sugar solution.

8. Crushed fruits and fruit syrups made up by the dispenser will keep in most instances as well as those put up in glass or tin.

—Apothecary, Nov., 1909, 31-33.

Dried Fruit Syrups—The Latest Pharmaceutical Novelty.—Under the name "Sirupi siccati," J. D. Riedel, of Berlin, has introduced dried syrups which apparently serve well for the extemporaneous preparation of certain syrups.

Sirup. Cerasor. sicc. and *Sirup. Rubi Id. sicc.* are supplied in form of granular powders of a yellowish to red-brown color, and the taste of pure cherry and raspberry syrups respectively. The powders are soluble in water and form syrups of the typical color of these fruit syrups.—Pharm. Ztg., lv (1910), No. 14, 147.

Syrup of Hoarhound—Formula.—Geo. M. Beringer finds that the following formula produces a very stable and satisfactory syrup of hoarhound, for which there appears to be a considerable demand in recent years :

Hoarhound in No. 20 powder	200 Gm.
Sugar	750 Gm.
Glycerin.	125 Cc.
Water, a sufficient quantity to make	1000 Cc.

Mix the glycerin with 375 Cc. of water and moisten the drug thoroughly with sufficient of the mixture, then pack lightly in a percolator and add enough menstruum to saturate and leave a layer above the drug and macerate for 24 hours. Then percolate slowly using the balance of the menstruum and then warm water till extracted. Reserve the first 500 Cc. of percolate and evaporate the remainder to 100 Cc. then add the reserve and dissolve the sugar in the liquid using a slight heat if necessary. When cold add sufficient water to make the preparation measure 1000 Cc. and strain. Syrup of hoarhound so made is clear, brown in color and possesses the characteristic bitter and aromatic taste of the drug and after keeping for more than six months has shown not the least tendency to change.—Proc. N. J. Pharm. Assoc., 1909, 45-46.

Sirup. Ferri Iodat. Ph. Gallic.—Objection to the Presence of Tartaric Acid.—With the object of preventing the formation of ferrous periodide

and consequent discoloration of syrup of ferrous iodide, the French Pharmacopœia directs the addition of tartaric acid. Quériault however finds, that the presence of tartaric acid is objectionable, since it causes an inversion of the sugar which proceeds quite rapidly.—Pharm. Ztg., lv (1910), No. 51, 107; from Rép. de Pharm. 1910, No. 1.

Syrup of Iron Iodide.—Expeditious Method of Assay.—A. Korndorfer recommends the following method for estimating the iodine content of syrup of iodide of iron, which depends on the liberation of the iodine by means of hydrogen dioxide: 5 Gm. of the Syrup, 5 Gm. of water and 3 Gm. commercial hydrogen dioxide are mixed in a glass-stoppered Erlenmeyer flask and allowed to stand 1–2 minutes; then 20 Gm. of chloroform and 10 Gm. of diluted sulphuric acid are added, and the flask is rotated until the liberated iodine is completely dissolved in the chloroform. Potassium permanganate solution (1 : 1000) is now added, for the purpose of destroying the excess of hydrogen dioxide; until the red color produced slowly fades to a wine yellow, and the mixture is then titrated with $\frac{N}{10}$ sodium thiosulphate solution, of which 16–16.2 Cc. should be required to completely decolorize the chloroform if the syrup is of official (G. P.) strength. The titration is best made by adding at once 10–12 Cc. of the thiosulphate solution and, after vigorous shaking, carefully continuing the titration, vigorously shaking after each addition until completed. Each cubic centimeter of the thiosulphate U. S. corresponds to 0.0155 ferrous iodide. Expedition is necessary in carrying out the titration because under the influence of the ferric sulphate formed the sodium iodide produced again parts with iodine. Apoth. Ztg., xxiv (1909), No. 90, 850.

Syrup. Iodo-Tannic, Ph. Gallic—Modification of Process.—The “Codex” directs that iodo-tannin syrup be prepared by finely pulverizing 2 p. iodine, mixing it with 4 p. tannin and heating it with 350 p. water in a capsule in the water bath (at about 60° C.) until the solution ceases to react with starch paste; then to add 640 p. sugar to finish the syrup. Courand, in order to avoid the loss of iodine, suggests that the iodine be triturated with twice its weight of sugar, and that the solution of the iodine and tannin be effected by heating them with the water in a strong, well-stoppered flask, otherwise following the directions of the “Codex” implicitly.—Pharm. Ztg., lv (1910), No. 51, 107; from Rep. de Pharm., 1910, No. 1.

Compound Syrup of Phosphates, N. F.—A Good Suggestion.—Andrew C. Parse, discussing the difficulties encountered in the preparation of the compound syrup of phosphates, and particularly the discoloration to which this syrup is subject, attributes the latter to caramelization of the sugar by contact with the strong mineral (phosphoric) acid. He has successfully overcome this trouble by preparing an acid solution, using all the prescribed ingredients except the sugar and coloring matter. Thus, in mak-

ing a quantity sufficient for a quart (32 fluidounces) of finished syrup, the acid solution made strictly according to the formula is brought to the measure of 28 fluidounces with water, filtered, and set aside until wanted. Then, to make an ounce of finished syrup, $2\frac{1}{4}$ drachms of sugar are triturated to fine powder in a mortar, dissolved in 7 drachms of the solution, the coloring matter is added, the mixture is simply shaken, and the syrup, brightly colored, is finished.—Proc. Arkansas Assoc. of Pharm. 1909, 82-85.

Syrupus Rhamni Cathartica, N. F.—*Preparation from the Berries.*—In their admirable paper on the syrups of the U. S. P. and N. F., quoted in another place, George M. Beringer and George M. Beringer, Jr., bring indisputable testimony that "fermented juice of buckthorn berries," which is directed in the N. F. for the preparation of the syrup, is not obtainable on the American market and is practically unknown. But both ripe and unripe buckthorn berries are imported from Europe, the latter being used as a dyeing material; and since buckthorn is grown infrequently in the United States, and supplies of fresh berries are therefore not available to the American pharmacists for the preparation of the juice, the authors recommend that syrup of buckthorn be made from the imported berries, which should be mature, ripe and carefully dried. These may be converted into fluidextract (which see under "Fluidextracta") and the syrup prepared by the addition of 0.2 Cc. each of oil of fennel and oil of cassia to 200 Cc. of this fluidextract and sufficient syrup to make 1000 Cc., or, as the authors prefer, by the following process direct from the berries:

Buckthorn berries, ground.	200	Gm.
Sugar.	800	Gm.
Oil of fennel.	0.2	Cc.
Oil of cassia.	0.2	Cc.
Water, a sufficient quantity.		

Add the ground buckthorn berries to two liters of boiling water, infuse for two hours, and then express. Infuse the dregs with 500 Cc. of boiling water and express when cold. Mix the expressed liquids, filter, and evaporate to 600 Cc.; in this dissolve the sugar by heat, and when cold strain, add the oils and make up to 1000 Cc. with water.—Amer. Journ. Pharm., July, 1909, 323-326.

Senna Syrups—Efficient Formulas.—Dr. P. E. Hommell, referring particularly to the aromatic and to the compound syrup of senna of the N. F., says it is surprising how many physicians either do not know, or else forget, that there are some palatable and efficient purgative syrups in the N. F. and U. S. P. Both of the N. F. preparations, when properly compounded, will please the prescriber, and possess the distinctive merit of not being imitations of proprietary preparations. The U. S. P. syrup of senna is also a good preparation, but should be free from precipitation and cloudiness,

which is the principal objection to it. The author therefore suggests the following improved formulas for

Syrupus Sennæ U. S. P.

Fluidextract of senna	250 Cc.
C. P. glycerin	125 Cc.
Spirit of coriander	50 Cc.
Simple syrup, sufficient quantity to make 1000 cubic centimeters.	

Mix the glycerin with the fluidextract and spirit of coriander and add a sufficient quantity of syrup to make the product measure 1000 cubic centimeters; mix thoroughly. The finished syrup leaves nothing to be desired. The addition of glycerin is doubly advantageous, being a solvent and a good preservative.

Another very efficient syrup, which the author considers a desirable addition either in the U. S. P. or N. F., is the

Syrupus Sennæ Mannatus, a formula for which was given in Prof. Oldberg's Unofficial Pharmacopœia (1881). This formula is given as follows :

Fennel, bruised, ten grams	10
Coriander, bruised, ten grams	10
Senna, finely cut, one hundred grams	100
Manna, one hundred and fifty grams	150
Sugar, six hundred grams	600
Boiling water, sufficient	—
Make one liter of syrup	1000

Digest the senna and spices with 500 fluidgrams of boiling water for two hours, strain, adding enough boiling water through the strainer to make the colature measure 500 fluidgrams. Allow it to settle, and then decant the clear liquid, add the sugar, and dissolve by agitation and the aid of gentle heat. Strain, if necessary, and add enough simple syrup to make the final product measure one liter.—Proc. N. J. Pharm. Assoc., 1909, 50-51.

Syrup of Wild Cherry—Practical Observations.—At an evening meeting of the North British Branch of the Pharmaceutical Society of Great Britain, two interesting papers on syrup of wild cherry were read and discussed, the one by Dr. R. R. Hallaway, the other by I. C. Umney. Dr. Hallaway's attention was first drawn to this preparation by finding he could not make a syrup which resembled in taste or odor the syrup sent out by some wholesale firms, though he followed the B. P. process exactly, and carefully examined the bark used to see if it corresponded with the B. P. description. The bought syrup varied, but in most cases the syrup was much deeper in color and much stronger and more astringent in taste than the home-made article. The author pointed out that there has been a change of opinion concerning the value of this preparation in America.

Formerly great value was placed upon it in certain kinds of cough, owing to the trace of hydrocyanic acid present, but leading writers on pharmacology now only regard it as a flavoring. After reviewing the literature (particularly the American) on the subject, Dr. Hallaway gives the details of his own work, the greater part of his paper being devoted to experimental details on methods for estimating the hydrocyanic acid in the syrup, for which purpose he finds the method of Fordos and Gellis (Sutton's "Volumetric Analysis") more satisfactory than the method recommended by Squire and that of the U. S. P.—the method of F. and G. being based on the reaction: $\text{HCN} + \text{I}_2 = \text{HI} + \text{CNI}$ (1 Cc. of $\frac{N}{20}$ iodine = 0.00067 Gm. HCN). The test is applied to the distillate from the syrup. The practical galenical points made in this paper are: (1) The addition of 1 $\frac{1}{4}$ fl. oz. of glycerin to 9 fl. oz. water to percolate the bark yields a deeper colored and more astringent syrup. (2) The thick bark yields a little darker colored and more astringent syrup than the young bark, but the difference is very slight. (3) The yield of HCN is larger if a larger quantity of water is used for the preliminary maceration than is directed in the B. P. (4) The addition of glycerin to the menstruum (water) increases the yield of hydrocyanic acid. (5) Even the syrup strongest in hydrocyanic acid does not exceed 0.008 per cent. HCN.

Mr. Umney's paper deals with a dispensing difficulty that occurs with this syrup—viz., precipitation of alkaloids with those syrups which are made with certain samples of bark as met with in commerce possibly not all derived from *Prunus serotina*. He submitted two samples as imported—one a comparatively thin bark, which might be of the younger branches of *Prunus serotina*, the other much thicker, more astringent, and giving an infusion much weaker in hydrocyanic acid. The syrup from the thicker bark is slightly darker in color and less pleasant in taste. The syrup is now largely used for cough-remedies in which the important soothing bodies such as heroin and codeine are contained. With these alkaloids the astringent syrup, and, indeed, most of the syrups of Virginian prune on the market, naturally cause precipitation of the alkaloids. They should be dispensed, therefore, with the greatest caution. The difficulty can be overcome, or to some extent obviated, by the selection of bark containing a minimum of tannin.—Chem. & Drugg. Dec. 25, 1909, 969.

TINCTURÆ.

The Tinctures of the Pharmacopæia are the subject of a critical review as regards quality of ingredient, process of preparation, and results, in a paper contributed by E. Fullerton Cook, which appears in the "Proceedings," 1909, 1000-1004.

Tinctures.—Proper Definition.—"K" criticizes the definition of the G. P. iv: "Tinctures are alcoholic, vinous or aqueous extractions of plant and animal substances," as being incorrect, and advocates a return to the

definitions of former editions, which consisted of the simple statement : "The Tinctures, in so far as not directed to the contrary, are prepared, etc., etc." He points out that some of the tinctures, so-called, are simply solutions, and others are mixtures. Pharm. Ztg., liv (1909), No. 90, 891.

Tinctures—Superior Stability and Activity when Prepared from Fresh Plants with Boiling Alcohol.—In the course of his studies on the glucosidal constituents of plants, which have been quoted in these reports annually for a number of years, Berquelot has demonstrated, not alone that the activity of tinctures prepared from dried vegetable drugs is far inferior to that of tinctures prepared from the fresh plant, but that tinctures from the latter prepared by extraction with boiling alcohol are decidedly more active than such prepared by cold extraction, and excel also in their appearance and stability. This superiority is imparted to the tinctures prepared with boiling alcohol by the destruction of certain enzymes present in the fresh plant which otherwise, even in the tinctures prepared by the older method, continue to exert their hydrolytic, oxidizing or reducing properties. While numerous experiments made by other investigators have confirmed Berquelot's observations, these have heretofore been confined to a small number of plants. Recently, however, M. Lesueur has completed a comprehensive series of studies on the same subject which must be regarded as a valuable supplement to Berquelot's investigations and a complete confirmation of his views. Thus, in a paper on cherry-laurel leaves which has recently been published, Lesueur gives the comparative values of four different tinctures prepared from the same leaves, two prepared from the fresh leaves—the one by extraction with hot the other with cold alcohol—and two prepared cold and hot from dried leaves: their comparative activity being determined in accordance with the biochemical method of Berquelot described in 1901, and consisting in the present case in the observation in the polarisator of the action of invertin and emulsin on the aqueous extract solutions prepared from the respective tinctures. A surprising result, preliminarily, was that the tincture prepared cold from the dried leaves apparently contained the largest amount of glucosides. A distinctly different result was shown, however, when a more accurate method of determining the activity of the tinctures was applied, consisting in the estimation of the hydrocyanic acid produced by the action of emulsin on the glucosidal constituent. The yield of HCN from the respective tinctures (representing 100 Gm. of fresh leaves) was thus shown to be as follows: From the tincture of fresh leaves prepared by the hot method, 0.1254 Gm.; prepared by the cold method, 0.085 Gm.; while from the tinctures prepared by the hot and cold method from the dried leaves the yields of HCN were successively still smaller.—Pharm. Ztg., liv (1909), No. 64, 623–624; from Jour. de Pharm. et Chim.

Tincture of Colchicum Corms.—Method of Preparation.—In the course

of studies on the influence of the method of preparation on the composition and stability of tinctures, Lesueur determined that the tincture of colchicum corms prepared by extracting the fresh drug with *hot* alcohol contains the highest alkaloidal percentage. The tincture prepared in the same way from the dry drug approximated in alkaloidal content to the first, but exceeded that in the tinctures prepared according to the Codex. He, however, ascribes this to the difference in the method of drying the drug from that commonly practiced. The corms were not sliced, but dried whole at a temperature of 30 to 32° C. Pharm. Ztg., lv (1910), No. 28, 282; from Journ. de Pharm. et Chim. 1910, No. 6.

Tincture of Citro-Chloride of Iron, N. F.—Advantage Over the U. S. P. Tincture of Ferric Chloride.—E. A. Ruddiman points out some of the advantages of tincture of iron citro-chloride over the U. S. P. tincture of ferric chloride. Apart from the taste, it is much less likely to produce precipitation or coloration in admixtures with other medicaments, and is more quickly made, requiring simple admixture of the ingredients (solution of ferric chloride, solution of sodium citrate and alcohol), without the subsequent prolonged standing required by the U. S. P. tincture. The author mentions some of the incompatibles of both tinctures and shows a favorable balance for the N. F. preparation which, he thinks, should replace the tincture now official in the U. S. P.—Proc. Tenn. Pharm. Assoc., 1909, 50–51.

Tinctura Delphinii Consolidæ is the subject of a paper by Curt. P. Wimmer, who recommends a formula based on a series of experiments given in some detail, in "Proceedings," 1909, 1133–1137.

Tincture of Digitalis—Practical Observations on Preservation and Standardization.—In a paper communicated to the North British Branch of the Pharmaceutical Society of Great Britain, Dr. R. R. Hallaway, after reviewing the work of Dixon and Haynes, of Focke, and of Dr. Houghton, which have pointed out the limitations of the stability of tincture of digitalis leaves, arrives at the conclusion that six months is a safe limit of time to keep this tincture, and that every pharmacist should endeavor to prepare just sufficient tincture to last him for this period or less. Moreover, taking everything into consideration, he thinks that the pharmacists are quite justified in using a shelf-bottle for dispensing stock of digitalis tincture, provided it is kept out of direct sunlight in an amber-colored bottle. As regards the drug itself, he agrees with Mr. Martin that digitalis leaves, properly collected, dried, and stored, retain their activity for many years. Furthermore, there is need (1) for work on the method of extracting the drug, and (2) as to the best method of standardizing. Referring to the verdict of the Committee of Reference on the B. P. that physiological tests are not feasible, he says that this may be so, but there is plainly a demand for drugs tested in this way; but even if not considered suitable to

authorize such tests in the next B. P., could not the monograph on digitalis embody the results on physiological standardization obtained by pharmacologists? They might also give the dispenser clear instruction as to the preservation of the crude drug and its preparations, and also how long these retain their activity.—Chem. & Drugg., Dec. 25, 1909, 970.

Compound Tincture of Gentian—Addition of Glycerin to the Menstruum Suggested as an Improvement.—Bloomfield Hulick observes that while the use of the stronger alcoholic menstruum than diluted alcohol directed in the U. P. P. viii for the preparation of compound tincture of gentian has been some help in preventing precipitation, it does not accomplish all that was expected. Some experiments made by adding glycerin to the menstruum promise better results. A tincture made with 120 Cc. of glycerin to each 1000 Cc. remained clear and showed no disposition to precipitate after standing three months.—Proc. N. J. Pharm. Assoc., 1909, 87–88.

Tincture of Iodine—Character of Changes on Keeping.—C. Courtot has experimentally determined that by prolonged keeping tincture of iodine undergoes changes resulting in the formation of hydriodic acid, acetaldehyde and acetic ether. By the action of the iodine on the alcohol, hydriodic acid and acetaldehyde are primarily formed. The latter, in presence of water, is then by action of iodine, oxidized to acetic acid, an additional quantity of HI being formed. In turn, the acetic acid then reacts with the alcohol to form acetic ether. These reactions are more pronounced during the first few months but gradually decrease, until eventually a condition of equilibrium is reached. In an example, a tincture prepared with 95 per cent. alcohol and 87.63 Gm. of iodine per liter, contained after seven months 15.36 Gm. of HI and only 72.32 Gm. of free iodine.—Pharm. Ztg., lv (1910), No. 346; from Journ. de Pharm. et Chim., 1910, Nos. 6 and 7, 297.

Tincture of Iodine.—Variable Commercial Quality.—Analyses of 7 samples of tincture of iodine by Ernest A. Noedel, obtained in Philadelphia and vicinity showed an iodine content varying from 4.522 to 7.172 Gm. the average being 6.455 Gm. in 100 Cc. The specimen containing the lowest amount of iodine, contained no potassium iodide; the other contained from 4.08 to 5.16 Gm. K. I. in 100 Cc.—average 4.67 Gm. Amer. Journ. Pharm. May, 1910, 243.

Commercial Tinctures of Iodine have been examined by Agnes Dunning and L. E. Sayre who communicate their observation in a paper which appears in the "Proceedings," 1909, 868–870.

Warburg's Tincture.—Criticism.—H. C. Bradford criticises the formula for Warburg's Tincture as it appears in the National Formulary and suggests certain improvements which are best consulted in the original, preferably in connection with the abstracts on similar criticisms which appear

in the "Proceedings," 1901, pp. 607-610. Mr. Bradford's paper is published in Merck's Rep. March 1910, 63.

TROCHISCI.

Troches—Official and Non-Official—Improved Formulas.—Geo. M. Beringer, Jr., and H. D. Kresge, regarding troches as the most elegant pharmaceuticals, yet the most neglected by the Pharmacopœia and National Formulary, have conducted a series of experiments with the object of the betterment of the published formulas. The flavorings of this class of preparations, have not kept pace with improvements in other lines, and it is a noticeable fact, that in all the Pharmacopœias (U. S., Br. Germ., Swiss, and others) which they have examined, most of the flavorings directed seem to bear no appropriate relation whatever to the substance to be disguised. The U. S. P. also, gives no standard for size or shape, and it may easily be imagined that prescriptions for the same lozenge at different stores will be filled with as many different shaped lozenges. Then also, in conformity with the German, French, Swedish and Swiss pharmacopœias in which 1 Gm. has been adopted, there should be uniformity in weight. The authors recommend this weight (1 Gm.) in their formulas and that the shape, with the possible exception of troches of cubeb, which by custom are usually dispensed in cylindrical form, should be circular (disc) shaped. The following is a list of troches for which improved or new formulæ are suggested, each formula being for 100 troches: Benzoic acid; tannic acid; ammonium chloride; charcoal; compound chloroform; cubeb; gambir; glycyrrhiza and opium; guaiac; red gum (eucalyptus gum); krameria; phenol; phenolphthalein; potassium chlorate; quinine tannate; santonin; santonin and calomel; sodium bicarbonate; sulphur and potassium bitartrate; elm.—Proc. N. J. Pharm. Assoc. 1909, 80-87.

UNGUENTA.

Ointments—Novel and Expeditious Method of Ascertaining Comparative Melting-Points.—E. Thorp has found the following method to give satisfactory results for ascertaining comparative melting-points of many ointments, which, of course, is not applicable for determining actual melting-points, but may prove useful as a means of classification and as an indication of their strength or sophistication:

Glass tubes of 5 Mm. diameter and 3 Cm. length were selected, and a small quantity of the ointment filled in up to a 1 Cm. mark on each by inserting the tube into the cold ointment under examination.

The outside of the tube being cleaned, 0.5 Gm. mercury was dropped into the open end, the mercury resting on the column of ointment.

The tube was then fastened by an elastic band to the bulb of a sensitive thermometer, and the whole suspended in a flask of cold water over a

small Bunsen-burner flame, and gently heated up. Directly the sample commences to melt, the pressure of mercury forces the ointment out of the lower end of the glass tube, and the temperature is read off.

The following ointments examined by the above simple method yielded temperatures as indicated :

Ung. boric.	41-42° C.	Ung. hyd. ammon.	39-40° C.
Ung. bellad.	35-36° C.	Ung. hyd. ox. rub.	40-41° C.
Ung. cetacei.	40-41° C.	Ung. paraffin	40-41° C.
Ung. carbolic	39-40° C.	Ung. plumbi acet.	44-45° C.
Ung. canthar.	48-49° C.	Ung. resinæ.	59-60° C.
Ung. eucalypti	41-42° C.	Ung. staphisagr.	43-44° C.
Ung. gallæ.	34-35° C.	Ung. sulphuris	35-36° C.
Ung. gallæ c. opio.	35-36° C.	Ung. zinci.	35-36° C.

—Pharm. Journ. and Pharmacist, Feb. 19, 1910, 204.

Cerates and Ointments—Suitable Base.—George H. White criticises the various bases that have in the course of time been substituted for wax and lard in the official cerates and ointments. In an experience covering many years he has found the unguentum of the U. S. P., 1890, made with yellow wax and benzoinated lard, to be an almost perfect base, which he believes can be used for all ointments except that of mercuric nitrate. As an alternative he recommends a base composed of 2 parts olive oil and 1 part wax.—Proc. N. J. Pharm. Assoc., 1909, 78-79.

Ointments, Liniments and Plasters—Preparation with Sesame Oil.—G. P. Forrester has compiled the following list of ointments, liniments and plasters of different Pharmacopœias in which the olive oil has been replaced by sesame oil (which see under "Materia Medica") :

<i>Ung. Leniens (Austria).</i>		<i>Empl. Saponatum (C.-S.).</i>	
White wax.	8	Emp. plumbi.	450
Spermaceti.	15	Cera alb.	75
Sesame oil.	62	Sapo durius.	38
Water.	15	Camphora.	8
Add ol. rosæ gtt. ij. to every 100 grams.		Ol. sesami.	15
<i>Ung. Zinci (Austria).</i>		<i>Ol. Camphoratum (Hungary).</i>	
Lard	63	Camphor.	25
Benzoin.	3	Ol. sesami.	75
White wax.	15	Sod. sulph. sicc.	8
Zinc oxide.	15	Filter.	
Sesame oil.	7		
<i>Ung. Rosatum (Croatia-Slavonia).</i>		<i>Ung. Adipis Lanæ (Hungary).</i>	
Oil of theobroma.	20	Adipis Lanæ anhyd.	100
Sesame oil.	40	Aqua.	25
Rosewater.	10	Ol. sesami.	25

<i>Ung. Acidi Boraci</i> (Hungary).		<i>Linimentum Calcariae</i> (Japan)-	
Paraffin, solid	50	Limewater.	
Cera alb.	30	Sesame oil, of each equal parts.	
Ol. sesami	300		
Melt together and add a previously prepared solution of boric acid, 25 in glycerin 75.		<i>Ung. Leniens</i> (Holland).	
		Cera flava	5
		Cetaceum	10
		Adeps lanæ	10
<i>Ung. Emoliens</i> (Hungary).		Ol. sesami	50
Cera alb.	20	Aq. rosæ	25
Cetaceum	40		
Ol. sesami	160	<i>Liniment. Ammoniatum</i> (Russia).	
Ol. rosæ	gtt. j.	Ol. olivæ	3
<i>Ung. Cantharid. Pro Usu Veterinar.</i>		Ol. sesami	1
(Hungary).		Liq. ammon.	1
Cantharis	40		
Ol. sesami	70	(Switzerland).	
Cera flav.	30	Ol. sesami	75
Terebinthina liq.	40	Liq. ammon.	25
Euphorbium	10		

The different formulæ given for the preparation of an equivalent of cold-cream and the use of sesame oil in their preparation point to the fact that these have borne the test of practical use. *Chem. & Drugg.*, April 16, 1909, 51.

Ointments and Lard.—Oil of Pimento to Prevent Rancidity.—G. Welborn states that oil of pimento has been found to possess valuable qualities when mixed with melted lard which has been allowed to cool until it assumes a creamy consistence. Sufficient of this oil is to be added to the lard to render its odor just slightly perceptible. In his experience both lard and ointments thus prepared are preserved from rancidity and discoloration after a lapse of two years under the conditions usually prevailing in pharmacies. *Pharm. Journ. and Pharmacist*, Sept. 25, 1909, 390.

Petrolatum.—Detection of Saponifiable Fats.—A. Ferraro recommends for the detection of saponifiable fats in petrolatum a reagent which is prepared by adding to a saturated aqueous solution of acid fuchsine just sufficient ammonia to discharge the color. Five Gm. of this is mixed in a porcelain capsule with 20 Gm. of the petrolatum to be tested. In the presence of fats, a portion of the ammonia will combine with the fatty acids, and a pink color will be regenerated in the mixture. Yellow petrolatum shows the reaction less distinctly than white, but it is easily seen on washing the mixture with a little alcohol. The solvent, when separated, should show no pink tint. *Pharm. Journ. and Pharmacist*, Octob. 23, 1909, 507; from *L'Union Pharm.*, 50 (1909), 400.

Petrolatum Spissum.—An Ideal Ointment Base.—Fred W. Ames, Jr. regards petrolatum spissum as being an ideal ointment base chiefly on the

ground, well understood, of its stability under all conditions of temperature or exposure to atmospheric influence, and its uniformity in character and composition. More noteworthy are his concluding remarks, in which he says that his opinion is based upon nearly five year's observation and experience in the tropics, which gave him an unusual opportunity for experiments, noting their effects, etc. In the number of years in the isthmus he served or came in contact with at least 200 physicians, some of them very exacting men, and he thinks petrolatum had an impartial trial. He found Petrolatum Spissum capable of meeting the most exacting requirements, and feels sure of his ground when recommending it as the ideal ointment base to the exclusion of all others. Merck's Rep., May, 1910, 131.

Unguentum Paraffini, B. P.—Improved Formula.—In search of a more satisfactory formula for "Unguentum Paraffini, B. P.," J. H. Franklin has prepared ointments, adding 5, 10, 15 and 20 per cent. of paraffin, white beeswax, bleached ceresin, or carnauba wax, to white petroleum jelly. According to the results, which are given in detail, it was found that an ideal ointment—white, firm, smooth, plastic and homogeneous—was produced with 15 per cent. of commercial carnauba wax. Unfortunately, carnauba wax is of uncertain composition as supplied by different makers. Satisfactory ointments may, however, be obtained by either of the following formulas: "A." White petroleum jelly, 85 parts; pure bleached ceresin, 15 parts. "B." White petroleum jelly, 84 parts; paraffin wax (m. p. 130° F.), 6 parts; pure bleached ceresin, 10 parts.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 313-317.

Ointment of Ammoniated Mercury—Assay.—Finding several methods for the assay of ammoniated mercury ointment unsatisfactory for one and the other reason, John R. Rippetoe worked out a satisfactory method which, briefly stated, consists in dissolving the fat in 2.5 to 3.0 Gm. of the ointment by shaking with 50 Cc. of ether, then shaking the mixture with .0 Cc. of 10 per cent. hydrochloric acid and 10 Cc. water, to dissolve the ammoniated mercury, and separating the acid solution from the ethereal solution, following this by thorough washing out with water. The acid mercurial solution is then treated with H₂S, the precipitated mercuric sulphide is collected on balanced filters or a Gooch crucible and, after washing, dried at 100° C. to constant weight, which multiplied by 1.0837 gives the weight of ammoniated mercury in the sample taken.—Amer. Journ. Pharm., May, 1910, 223.

Unguentum Hydrargyri Cinereum—Method of Preparation in Small Quantities.—Dr. B. Börner recommends the following method for preparing the ointment of mercury of the G. P. in small quantities by the pharmacist, which secures a fresh ointment of proper quality with little trouble, except the occasional shaking required for short periods during several days: Place mercury, 300.0, anhydrous woolfat, 45.0, and castor oil, 45.0,

into a strong bottle of double the capacity of these ingredients; heat the mixture on a steam-bath, then shake vigorously until cool. Repeat this operation the next day—if convenient twice—shaking each time until cool, and continue this treatment from day to day until the mercury appears completely extinguished when examined under a lens. This requires altogether only a few days. The mixture is then incorporated with a previously melted and nearly cold mixture of lard, 310.0, and suet, 200.0.—Apoth. Ztg., xxiv (1909), No. 94, 887.

Ungt. Hydrarg. jodat. pultiforme.—*Preparation.*—Dr. v. Ammon gives specific directions for preparing mercurous iodide in form of a magma containing the salt in an impalpable condition (see *Mercurous Iodide*, under "Inorganic Chemistry"), from which he prepares a 10 per-cent. stock ointment, possessing unlimited stability, and from this by dilution a 1 per-cent. ointment. The magma (13 Gm., composed of 2.5 Gm. HgI and 10.5 Gm. water) is incorporated with 12 Gm. anhydrous woolfat, removing the water that does not combine and replacing it with woolfat—this requiring an additional 5.5 Gm. of the latter. This forms a 10 per-cent. stock ointment from which the 1 per-cent. ointment, recommended in practice, is prepared by dilution, as follows: Stock ointment, 1 Gm.; anhydrous woolfat, 1 Gm.; American vaselin, 8 Gm. To be carefully protected from light.

Ungt. Hydrarg. bijodat. pultiforme is prepared in a precisely similar manner from a magma of mercuric iodide, as indicated in the articles on mercuric iodides above referred to.—Pharm. Ztg., lv (1910), No. 19, 191; from Münch Med. Wschr., 1910, No. 91.

Cremor Mercurialis—*Improved Formula and Manipulation.*—Reginald R. Bennett finds the directions in the supplement to the B. P. C. for the preparation of mercurial cream to yield a satisfactory preparation with extreme difficulty and has devised the following formula and manipulation which has proven very satisfactory:

Mercuric chloride	13 60
Hypophosphorous acid	100 00
Distilled water.....	} of each a quantity sufficient.
Alcohol, 90 per cent.	
Absolute alcohol....	
Japan Wax	7 50
Camphor	10 00
Creosote	10 00
Almond oil, sterilized, sufficient to produce	100 00

Dissolve the mercuric chloride in 300 of boiling distilled water in a lipped beaker, filter if necessary, and cool the solution to 40° C. Add the hypophosphorous acid, stir very cautiously, and keep the mixture at about 40° C. for an hour, by which time the gelatinous white precipitate of mer-

curous chloride which is first formed should be completely reduced to a heavy greyish-black precipitate of finely divided metallic mercury. Pour off the supernatant liquid and wash the mercury by decantation with successive quantities of cold distilled water until the washings are no longer acid and contain no trace of chloride. The precipitated mercury is then transferred to a porcelain basin and washed first with alcohol, 90 per cent., and finally with a little absolute alcohol; the latter should be poured off as completely as possible, and the basin then kept in a warm place until the last of the alcohol has evaporated. The camphor dissolved in 60 of the previously sterilized almond oil, cooled to about 40° C., is next added to the mercury, and the mixture is rubbed to a smooth cream with a sterile pestle; next the melted Japan wax is added, then the creosote, and finally enough sterilized almond oil to make the mixture measure 100.—Pharm. Journ and Pharmacist Feb. 12, 1910, 170.

Ung. Resorcini Comp.—Improved Manipulation.—J. G. Roda, discussing the difficulties encountered in the preparation of a satisfactory compound resorcin ointment, observes that the trouble in the official process seems to be that there is too much oil of cade to be added, and that the moisture from the hydrous wool fat is so great that the powders cannot be thoroughly worked up. They simply lump together and slip around under the pestle. The trouble is overcome, and a perfectly smooth ointment results by operating as follows: Rub up the zinc oxide and bismuth subnitrate separately with portions of the lanolin. Melt the paraffin and petrolatum and add the oil of cade (using only six parts instead of twelve). Next add the resorcinol to the melted paraffin and petrolatum and thoroughly incorporate. Add this mixture to the zinc oxide and bismuth subnitrate in a large mortar and triturate until cool.—Pacif. Pharm., Aug., 1909, 106–107.

Compound Resorcin Ointment is improved according to J. O. Burge by a modification of the N. F. formula which he proposes in the "Proceedings," 1909, 1160.

Improved and Original Formulas are given by Abraham Weinstein for Ung. Resorcini Comp., Mist. Pectoralis Stokes, and Vin. Carnis et Ferri, in "Proceedings," 1909, 1131–1133.

VINA.

Wine of Pepsin—Classification.—Otto Schmatolla reviews the causes of turbidity of pepsin wines and the difficulty of permanent clarification. He attributes this exclusively to the wine, and particularly to the younger wines, which contain pectin substances and other bodies that are responsible for the change, and recommends the removal of these before dissolving the pepsin in the wine, in which event a second filtration will become necessary, or to treat the wine after the pepsin has been dissolved but before the addition of syrup or, better, the necessary quantity of

sugar. It suffices to digest the wine (after maceration with the pepsin and hydrochloric acid for two or three days) with 2 per cent. of skim milk, heating it rapidly to about 50° C. and immediately cooling, then filtering. This filtration is rapid and the wine permanently clear. The syrup or sugar is then added.—Pharm. Ztg., lv (1910), No. 22, 223.

Detannating Wine is the subject of a paper in which Wilbur L. Scoville suggests a simple method of accomplishing this. It is printed in the "Proceedings," 1909, 998-1000.

Beef, Wine and Iron is the subject of a critical examination, both as to the quality of the ingredients and the formulas, by L. E. Sayre, which is described in a paper published in "Proceedings," 1909, 1140-1142.

Beef, Wine and Iron is the subject of a critical and experimental inquiry by H. Engelhardt and H. W. Jones into the merits and demerits of the N. F. process for its preparation, which appears in "Proceedings," 1909, 870-874.

MISCELLANEOUS PREPARATIONS.

Absorbent Cotton—Preparation.—K. Helfritz gives some practical information concerning the technical preparation of absorbent cotton. The fat is first removed by prolonged boiling under pressure with a solution of NaOH or of an alkaline rosin-soda soap, and thorough washing with soft spring water. The cotton is then bleached by immersion in clear solution of chlorinated lime, the latter being removed by one of several methods. One method consists in profuse washing with water, treatment with very diluted hydrochloric acid immersion in a bath of sodium hyposulphite, to remove the liberated chlorine, and addition of stearin soap. This reacts with hydrochloric acid still retained by the cotton, stearic acid being liberated, and this imparts to the absorbent cotton the peculiar "crunching" between the fingers which has in recent years been demanded of a good article. This "crunching" may, however, be removed by treatment with very dilute solution of sodium bicarbonate. If it is desirable to destroy the absorbent property of the cotton, this may be done by rinsing it in a solution of alum. It is a *sine qua non*, however, that to secure a uniformly satisfactory preparation, the thorough and copious washings with water after all of these operations must be rigidly observed.—Pharm. Zentralh., 51 (1910), No. 6, 101-103.

Formalin-Iodine Catgut.—Preparation and Advantages.—Dr. J. Steward finds that skeins of ordinary formalin catgut, immersed for ten days in a 1 per cent. aqueous solution of iodine, afford the most satisfactory material for surgical sutures. At the commencement of the operation, one of these skeins is placed in 1 : 20 carbolic acid solution, which removes excess of iodine, that might possibly cause irritation. Catgut prepared in this manner does not swell inconveniently, nor become too elastic, as raw catgut

sterilized by immersion in alcohol and water does. This formalin-iodine catgut is very strong and resistant, so that too rapid absorption does not occur. It is very smooth, uniform in diameter, and inelastic, therefore easy to manipulate. Owing to its tensile strength and its resistance to absorption, fine sizes can be used. For skin sutures No. 000,000 is employed; this does not become absorbed for eight or ten days if the wound be dry; it therefore lasts long enough to ensure firm union, but does not require removal, and the stitch-holes soon disappear. For intestinal work No. 00 has given satisfaction. For muscles, aponeuroses, and tendons, Nos. 1 and 2 are used. These sizes are not absorbed for quite a month. Catgut thus prepared is preferable to that which has undergone more complicated processes, and the method is one which can be conveniently carried out by the surgeon. The finer sizes are apt to become somewhat brittle if kept for several months in the iodine solution.—*Pharm. Journ. and Pharmacist*, Oct. 23, 1909, 507; from *Brit. Med. Journ.* 1909, 2, 932.

Chilblain Cones—An Australian Formula.—P. W. Merfield recommends the following formula for "Chilblain Cones," which, coming from far-away Australia, deserves attention: Camphorated menthol (2 p. menthol to 1 p. camphor), 2 drachms; iodine, 6 grains; tannic acid, 2 drachms; carbolic acid, 18 grains; powdered alum, 2 drachms; cacao butter, 13 drachms; white wax, 4 drachms. Melt the wax and cacao butter; while still warm add the iodine, and then the carbolic acid, the tannic acid and the alum. When nearing the pouring-out point put in the camphorated menthol, and stir well while pouring the mass into 60-grain pessary moulds. Dispense the cones wrapped in foil.—*Bull. Pharm.*, Dec., 1909, 508.

Corn Cure—A New Formula.—F. Boettger recommends the following formula for a corn cure which differs from similar formulas in common use by the introduction of some oil of turpentine and a little glacial acetic acid:

Salicylic acid	300	grains.
Extract of cannabis indica	30	grains.
Oil of turpentine	2½	fluidrachms.
Collodion, U. S. P.	5	fluidounces.
Glacial acetic acid	1	fluidrachm.

Mix the three first ingredients, add the collodion, and lastly the acetic acid.—*Bull. Pharm.*, July, 1909, 296.

Commercial Detergents—False Representation.—H. Droop Richmond finds that commercial detergents consisting of partially dehydrated sodium carbonate or of sesqui-carbonate are now on the market which are claimed to be from four to ten times stronger than, and sold at from three to seven times the price of, "soda crystals." Analyses show that the percentage of Na_2CO_3 varies from 47.6 to 90.1, and that they are but rarely above twice the strength of soda crystals. The strength of solutions for cleans-

ing dairy utensils is found to be 0.15 per cent. Na_2CO_3 , and it is pointed out that the directions given by manufacturers of detergents yield a solution of substantially that strength. Both by analysis and from the statements of the manufacturers, the claims put forward are shown to be unwarranted.—Chem. News, May 13, 1910, 526.

Magma Bismuthi furnished an interesting topic for review and experimentation by Otto Raubenheimer, who describes in great detail the conditions necessary to produce an acceptable preparation and gives a formula in a paper published in "Proceedings," 1909, 1024-1031.

Potassium Chlorate Tooth Paste—Formula.—Dr. Ernst Richter recommends the following formula for a tooth paste: Potass. chlorate, 1200.0; medicinal soap, 400.0; precip. calcium carbonate, 800.0 glycerin, 1200.0; distilled water, 360.0; oil of peppermint, 320; oil of cloves, 7.0. The soap and potassium chlorate should be in fine powder, and powdered separately. The paste is dispensed in collapsible tubes.—Apoth. Ztg., xxiv (1909), No. 91, 859.

C. NEW REMEDIES

AND TRADE-NAMED PREPARATIONS.

Acid, Arsino-Salicylic has been introduced as a substitute for atoxyl. It occurs in colorless needles, melting at 300°C ., and readily soluble in warm water and alcohol, but sparingly soluble in ether.—Pharm. Ztg., lv (1910), No. 44, 449.

Adrenochrom is the name of a sulphur compound of the suprarenal gland which is exploited as an internal remedy for the treatment of skin diseases.—Pharm. Ztg., liv (1909), No. 68, 662.

Afermol is the name given to a dried bloodserum, obtained from horses with great precaution, which is recommended as a dusting powder, either by itself or in admixture with "substitol" (which see) in the proportion of 3 : 1 or 4 : 1.—Pharm. Ztg., liv (1909), No. 68, 662.

Agaroma is the name given to purified gelatina japonica (agar-agar), aromatized, to make it more palatable, with a fruit extract absolutely free from acidity.—Pharm. Zentralh., 51 (1910), No. 4, 66.

Agarose is the name given to a Swiss specialty supplied in form of tablets composed of agar-agar and Bulgarian lactoferment, which are recommended in stomach and bowel affections.—Pharm. Ztg., lv (1910), No. 42, 428.

Almatzin is the name of a new astringent antiseptic, a condensation product of formaldehyde and haematoxylin of the formula $\text{C}_{28}\text{H}_{32}\text{O}_{14}$. It is supplied in form of a fine, brick-red, odorless and tasteless powder, insoluble in cold water, sparingly soluble in boiling water, but readily soluble in alcohol, glycerin and glacial acetic acid. It is recommended as an

efficient substitute for iodoform.—Pharm. Ztg., lv (1910), No. 32, 325 ; from Gehe & Co's. Spring Report, 1910.

Alsol.—G. Mossler states that aluminum acetotartrate, which is chemically identical with "alsol," is made by evaporating together on a water-bath 100 parts of freshly prepared solution of aluminum acetate and 3.5 parts of tartaric acid, stirring the liquid until a pellicle begins to form, when it is spread on glass plates and dried at a temperature not exceeding 30°. It forms colorless or slightly yellowish scales, with a slight odor of acetic acid, and a rather acid and astringent taste. Very soluble in water (1 in 1), but it dissolves slowly ; insoluble in alcohol. If ignited the ash shows the reactions of alumina, but a water solution of the substance gives only a slight turbidity with ammonia, which disappears on shaking, the tartaric acid preventing precipitation. If boiled with an equal weight of potassium carbonate and filtered, the cooled filtrate when acidified with acetic acid gives on standing a precipitate of potassium bitartrate.—Pharm. Journ. and Pharmacist, June 15, 1910, 788 ; from Ztschr. Allgem. Oesterr. Apoth. Ver., March 26, 1910, 129.

Aluminol.—According to G. Mossler, aluminum naphthol disulphonate, which is chemically identical with alumnol, is made by acting on β -naphthol with sulphuric acid, converting the sulphonic acid so obtained into the barium salt, and decomposing a solution of the latter with a solution of aluminum sulphate ; after filtering out barium sulphate the filtrate is evaporated to dryness. It occurs as a colorless or slightly reddish powder, with slightly acid and astringent taste. Very soluble in water (1 in 1), less soluble in alcohol, insoluble in ether and chloroform, soluble in glycerin ; the water solution has an acid reaction, and both it and the alcoholic solution have a slight blue fluorescence, which is increased by the addition of alkali. Strong sulphuric acid gives a red or brown-red color with the solid substance ; ferric chloride gives a strong blue color with an aqueous solution ; ammonia added to an aqueous solution precipitates alumina, and the liquid then has a strong blue fluorescence. The compound should be free from lead, iron, barium, and free naphthol. It contains from 10 to 18 per cent. of water ; after removing this by drying the dried substance should leave 10.5 per cent. of ash of Al_2O_3 on igniting until the weight is constant.—Pharm. Journ. and Pharmacist, June 11, 1910, 727 ; from Ztschr. Allgem. Oesterr. Apoth. Ver., March 26, 1910, 129.

Amenyl is the name given to a specialty recommended in menstrual disturbances, which is a hydrastin derivative designated by its discoverers as "methylhydrastimidchlorhydrate." It is supplied in form of faint yellow needles (crystallized from absolute alcohol), melting at 227° ; and soluble in water. On addition of NH_3 , Na_2CO_3 , or $NaOH$ to its solution, the free base is precipitated. This, when crystallized from alcohol, forms

yellowish needles, melting at 192° .—Pharm. Ztg., liv (1909), No. 92, 909; from Therap. Monath., 1909, No. 11.

Amidoazotoluol Medicinale "Agfa" is the title given by the manufacturer to the coloring matter purified for medicinal use, and forms the basis of the so-called "scharlach rot" (scarlet-red) and "scharlach-salbe" of commerce. The medicament is supplied in the form of a red-brown crystalline powder, becoming yellow by trituration, and melts at 102° C. It is sparingly soluble in soda solution with yellow color, but forms a red-yellow solution with concentrated sulphuric acid, becoming purplish-red on addition of water. —Pharm. Ztg., lv (1910), No. 12, 121.

Anisothobromine.—According to G. Mossler, the compound of theobromine-sodium and sodium anisate, chemically identical with anisothobromine, is prepared by dissolving 45 parts of theobromine in an aqueous solution of the calculated equivalent of caustic soda, and 30 parts of anisic acid in sufficient sodium carbonate solution to neutralize it, then mixing the two liquids and evaporating to dryness. It forms a white, odorless powder, having a saline, bitter taste, soluble with difficulty in cold water or strong alcohol, more soluble in hot water or dilute alcohol, insoluble in ether and chloroform; its solutions are alkaline in reaction.—Pharm. Journ. and Pharmacist, Nov. 28, 1910, 677; from Ztschr. Allgem. Oester. Ap. Versin, April, 1910, 149.

Antileprol is the name given to purified chaulmoogra oil, and is recommended as a specific in lepra.—Pharm. Ztg., lv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

Antimonyl-Anilintartrate (Emétique d'aniline) is the name given to a remedy for *trypanosomen* (sleeping sickness). It is supplied in form of handsome white crystals, containing 22 per cent. of antimony, which are soluble in 7 p. of water at the ordinary temperature, and are less poisonous than the corresponding potassium salt, tartar emetic.—Pharm. Ztg., liv (1909), No. 93, 919.

Argonin.—According to G. Mossler, silver caseinate, chemically identical with argonin, is obtained by mixing equivalent quantities of solutions of sodium caseinate and silver nitrate, and precipitating the silver compound by adding alcohol. It forms a greyish-white odorless powder, soluble in water up to 10 per cent., the solution having a weak alkaline reaction and an opalescent appearance; it dissolves in alkaline liquids and solutions of albumen. The aqueous solution is not precipitated by sodium chloride, but on adding nitric acid also silver chloride is formed; on adding to a water solution a few drops of alkali and one drop of copper sulphate solution, and warming gently, a violet-red color is produced; if 0.5 Gm. is ignited, and the ash dissolved in nitric acid, the addition of ammonium molybdate should show the presence of phosphate derived from the casein. The compound should contain 4 to 4.3 per cent. of silver.—

Pharm. Journ. and Pharmacist, May 28, 1910, 477; from Ztschr. Allgem. Oesterr. Apoth.-Ver., March 26, 1910, 130.

Arsanaemin is the name given to a arsenic-iron-pepsin saccharate, containing 0.0076 per cent. of arsenic.—Pharm. Ztg., lv (1910), No. 6, 59.

Arsen-Hæmatose, a new arsenic-iron specialty, has been examined in the Pharmacological Institute of Innsbruck, and determined by the analysis to be an arsenic-iron-phosphorus-cinchona wine, containing 0.04 per cent., 0.15 per cent. phosphorus (both in form of glycerophosphates), and 0.0026 per cent. arsenic in form of potassium arsenite, together with 15 per cent. of extractive matter and 0.045 per cent. of cinchona alkaloids. The wine used in this preparation is apparently a Southern sweet wine, free from tannic acid.—Pharm. Ztg., lv (1910), No. 8, 79; from Wien. Klin. Rundsch., 1910, No. 1.

Arsotropin (Tabulettæ Iodi cum Arseno et Belladonna), a specialty recommended for painful nervous affections and epileptic conditions, is composed of arsenic iodide and extract of belladonna.—Pharm. Ztg. lv (1910 No. 37, 376; from Wien. Klin. Rundsch., 1910, 257.

Astrolin is the name given to a migrain remedy having a definite composition, which has recently been placed on the market by a German manufacturing house. It is in its chemical relations to be regarded as antipyrine methylethylglycolate (or pyrazolen phenyl dimethylicum methylæthylglycolicum), and has the empirical formula $C_{16}H_{22}O_4N_2$. Astrolin is a colorless, non-hygroscopic, crystalline powder, having a faint odor, and agreeably acidulous taste, with a slight, transient bitterness. It is very soluble in (1 part or less) water, alcohol, benzol, chloroform, acetic ether and acetone, but requires 75 parts of ether for solution, and is very sparingly soluble in benzin and ligroin.—Pharm. Ztg., liv. (1909) No. 68, 661.

Asurol is a new synthetic mercury compound intended for syphilitic treatment, uniting with a high mercury content (43.3 per cent.) readily soluble in water, forming stable solutions which are not reducible by contact with metals, do not precipitate albumen, and applicable by injection without irritant or toxic effect. The new compound is regarded as being the double salt of mercuric salicylate and sodium amidooxyisobutylate, replacing the insoluble mercuric salicylate with the advantage of solubility and the possibility of insuring the activity of mercury in larger proportion.—Pharm. Ztg., liv (1909), No. 100, 988; from Therap. Monatsh., 1909, No. 12.

Automors is the name given to a disinfectant which is exploited as being far superior to carbolic acid, and is apparently a cresol preparation containing some free sulphuric acid. It is a dark brown, clear fluid, having tarry, faintly acrid, odor, and miscible with water to form a brownish, milky

fluid of acid reaction. The preparation is recommended chiefly in form of 1 per cent. solution for disinfecting and deodorizing putrescent matter, feces, etc.—Pharm. Ztg., liv (1909) No. 60, 587.

Auxilium Medici is the name given to a preparation of hydrogen dioxide, which is qualified by its exploiters as being "Hydrogen. peroxydat. medicinale stabilitate prominens." It has recently been examined by E. Richter, who finds it to be a 3 per cent. solution of H_2O_2 containing phosphoric acid, and possessing good stability, but that it has high acidity, and has no special properties that offer advantages over ordinary 3 per cent. solutions of hydrogen dioxide.—Apoth. Ztg., xxv (1910), No. 12, 97.

Bromophor is a specialty containing dibromlarizinolic acid. Applied by penciling to the skin, it produces a thin cuticle containing 25 per cent. of organic bromine. It is recommended in prurico and erysipeladous wounds.—Pharm. Zentralh., 51 (1910), No. 16, 324.

Bromovose is the name given to a fluid said to contain an organic compound of bromine and albumen, and to be devoid of alcohol and free hydrobromic acid.—Pharm. Ztg., liv (1909), No. 74, 727.

Brovalan is the name given to an effervescent salt of mentholvalerate and bromide.—Pharm. Zentralh., 50 (1909), No. 43, 869.

Ceromentum is the name given to a compound of menthol and *eucerin* (see Proceedings, 1909, 152), which is recommended as an external remedy in pulmonary tuberculosis.—Pharm. Zentralh. 50 (1909), No. 52, 1082.

Cethal is the name given to a specialty recommended for pulmonary affections and is said to consist of cinnamylmethyl and 10 per cent. of thymol. It is used by inhalation, for which a special apparatus is also exploited.—Pharm. Zentralh. 50 (1909), No. 52, 1082.

Chinothein is the name given to a new antipyretic specialty which is said to be composed of molecular quantities of quinine and antipyrine with the addition of 5 per cent. of caffeine.—Pharm. Ztg., liv (1909), No. 77, 758; from Les nouveaux remèdes, 1909, No. 17.

Choleglycerin is a specialty recommended in hepatic and gall-bladder ailments, which is said to contain the pancreatic ferment and pepsin in saturated glycerin solution.—Pharm. Ztg., lv (1910), No. 25, 253.

Coffeinphenazon (*Pyrazolonum Phenylidimethylicum Coffeinocitricum*)—*Efficient Formula for a Migrain Powder*.—Dr. Bulenheim finds that a stable and efficient headache or migrain powder is obtained by the simple admixture of 1 p. *anhydrous* citric acid, 9 p. caffeine and 90 p. phenozone, all in fine powder. It is important that the citric acid be rendered completely anhydrous over sulphuric acid.—Pharm. Ztg. lv (1910), No. 30, 304.

Comain is the name given to a new iodine preparation, which is said to be prepared under certain provision from solutions of iodoform and

camphor in benne oil. Under various physical influences, the iodine is liberated from the iodoform; the liberated iodine unites partly with the camphor to form camphor mono- and di-iodide, and partly with the unsaturated oleic acids, yielding with these certain addition products under such regulation as to proportions that each cubic centimeter of the "comain" contains one centigram of active iodine compounds.—Pharm. Ztg., liv (1909), No. 92, 909; from Rep. of Proc. Germ. Naturalists and Physicians in Salzburg.

Convacocha are aqueous infusions of vegetable substances which are concentrated *in vacuo* to the original weight of the drug extracted, and are recommended by their exploiter as substitutes for the corresponding infusions or decoctions.—Pharm. Ztg., lv (1910), No. 46, 472.

Cucasa is the trade name given to a disinfectant and protective preparation for plants, said to be composed of molecular quantities of cupric sulphate, slaked lime and sugar. It is claimed to possess all the bactericidal properties of "Bordeaux Mixture," with the additional advantage of forming clear solutions in all dilutions and remaining clear for a comparatively long time.—Pharm. Ztg., liv (1909), No. 85, 839; from Südd. Apoth. Ztg., 1909, No. 83.

Cupferron is the name given to nitrosophenylhydroxylaminifammonium, an organic compound which has the property of forming with copper and iron complex insoluble salts, and therefore serves well for the separation of these two metals from nearly all other metals with which they are associated.—Pharm. Ztg., lv (1910), No. 32, 326; from Gehe & Co.'s Spring Report, 1910.

Cusol is the name given to a specialty containing copper citrate rendered soluble by the addition of sodium chloride and boro-citrate. It is supplied in form of solutions, ointments and powder, and is exploited as a remedy for skin diseases.—Pharm. Ztg., lv (1910), No. 33, 334; from Wien. klin. Rundsch., 1910, 188.

Dedasol is the name of a specialty containing the total active constituents of an equal weight of digitalis leaves, physiologically standardized. It is supplied in form of

Dedasol Tablets, each representing 0.1 Gm. of the leaves.—Pharm. Ztg., lv (1910), No. 25, 253.

Digistrophan is the name given to tablets containing the active constituents of digitalis leaves and strophanthus seeds, each representing 0.1 Gm. of the first and 0.05 Gm. of the last named. They are said to be obtained by concentrating the necessary quantities of fluidextracts of the two drugs in a vacuum and incorporating the extract with milksugar.—Pharm. Ztg., lv (1910), No. 30, 305; from Therap. d. Gegenw., 1910, No. 4.

Droserin is the name given to tablets containing the peptonizing enzyme

and active constituents of the *Droseraceae*, assisted with milksugar. These tablets are supplied in two strengths and are recommended for the treatment of whooping cough.—Pharm. Ztg., lv (1910), No. 4, 37.

Dysphagin is the name given to a specialty in form of tablets, recommended in angina and throat affections. It is supplied by its exploiters in three numbers, each differing from the other in composition. No. 1 contains cocaine, menthol, anæsthesin, sodium bicarbonate and aromatics. In No. 2 cocaine is omitted, and No. 3 is said to be composed of anæsthesin, citric acid, tannin and polymeric aluminum acetate.—Pharm. Zentralh., 51 (1910), No. 5, 89.

Eosserin is the name given to the antitoxin of erysipelas in hogs.—Pharm. Zentralh., 51 (1910), No. 5, 89.

Epileptin is the name given to a specialty in form of 1 Gm. tablets, containing borax, zinc oxide, potassium bromide, phenacetin, sodium lactate, pepsin, sodium bromide, ammonium bromide, boric acid, and starch.—Pharm. Zentralh., 51 (1910), No. 22, 473.

Eumictin is the name given to a specialty recommended as an antigonorrhoeum. It is supplied exclusively in the form of capsules and is said to be composed of santalol, salol and urotropine; but experimental investigation has failed to establish the presence of the last named ingredient.—Pharm. Ztg., liv (1909), No. 100, 988; from. Pharm. Weekblad, 1909, 1027.

Eupraxin is the name given to a lecithin compound containing aromatic extractive substances and chocolate, which is recommended as a nerve confection.—Pharm. Zentralh. 50 (1909), No. 52, 1082.

Eurigen is a preparation containing 6 per cent. of iodine, 10 per cent. of camphor and 2.5 per cent. of menthol, which is recommended for the relief of frost bite.—Pharm. Zentralh., 50 (1909), No. 52, 1082.

Fenchyval is the name given to fenchylisovalerianic acid ester, a nearly tasteless fluid with a faint odor reminding of valerian. It has a sp. gr. at 15° C. of 0.945; b. p. below 120° and 125° C., and is recommended in hysteria, vertigo, nervous depression, etc.—Schweiz. Wschr. f. Chem. u. Pharm., xlviii (1910), No. 15, 237.

Fcolathan is the name given to a ferruginous specialty which is claimed to be chemically a double salt, ferro ammonium lactate, obtained similarly to ferro ammonium sulphate. It is obtained in the form of a dark brown mass, with green fluorescence, containing approximately 7 per cent. of iron, and is supplied in the form of pills, each corresponding to 0.1 Gm. fcolathan.—Pharm. Ztg., liv (1909), No. 88, 873.

Fermatorol, a Belgian specialty recommended as an antiseptic and prophylactic, has been qualitatively analyzed by Dr. Aufrecht. It is supplied in collapsible tubes in form of a yellowish, fairly homogeneous, cream-like

mass, and is apparently a mixture of chinisol, aluminum acetate, tartaric acid, and boric acid or sodium borate.—Pharm. Ztg., liv (1909), No. 54, 532.

Ferricodile is the name of a Parisian specialty supplied in tubes containing 0.005 Gm. ferrum cacodylicum oxydatum in solution, and in form of pills, each containing 0.025 Gm. of this compound.—Pharm. Zentralh., 51 (1910), No. 7, 131.

Ferrovose is the name given to a preparation containing a compound of iron and albumen (see Bromovose).—Pharm. Ztg., liv (1909), No. 74, 727.

Formcallistan is a specialty composed of formaldehyde and plant mucilage.—Pharm. Ztg., liv (1909), No. 68, 662.

Formobas is the name given to a disinfectant solution of formaldehyde and borax in water. Recent investigations of Kutscher show the preparation to contain 33.3 to 38.3 per cent. of formaldehyde and 0.25 to 1.3 per cent. of borax, but that its stability is limited owing to the polymerization of the formaldehyde.—Pharm. Ztg., lv (1910), No. 40, 409.

Frangol is the name given to a liquid extract of frangula bark prepared by a special process, which is recommended as a substitute for liquid extract of cascara sagrada. Possessing the same activity, it is claimed to produce painless peristaltic action, and therefore particularly serviceable during confinement.—Pharm. Ztg., liv (1909), No. 85, 839.

Frigusin, a remedy recommended for frost-bites, is prepared under a German patent and is stated to contain organic iodine as active ingredient, which, according to its manufacturers, is *dijodlariziolic acid* ($C_{20}H_{16}(OH)_2I_2$). Applied to the skin forms an adherent varnish and gives off iodine without irritant action.—Pharm. Ztg., lv (1910), No. 20, 205.

Fucophyt is an antifat specialty in the form of tablets, each containing 0.1 Gm. dry extract of bladder-wrack, powdered poke-root, and dried extract of cascara sagrada.—Pharm. Zentralh., 51 (1910), No. 8, 156.

Fumiform is the name given to tablets, weighing 2 Gm. each, composed of purified asphalt with small quantities of myrrh and benzine, which are used in apparatus of special construction for fumigations in the treatment of pulmonary tuberculosis. The patient is required to remain in a close apartment filled with the vapor produced for two hours, once or twice daily.—Pharm. Ztg., liv (1909), No. 68, 662.

Galegol is a new galactagogue prepared from *Galega officinalis* under special precautions in extraction of the drug and evaporation of the extract, which is finally granulated with milk sugar. It is supplied in the form of small brown granules, which are readily soluble in water, milk, coffee or tea, and have an agreeable taste. A coffeespoonful of the granules contains $\frac{1}{2}$ Gm. of the extract.—Pharm. Ztg., lv (1910), No. 42, 428.

Gelonida is the protected generic name of tablets containing the so-called "trioxymethylen-gelatin" as a base. The latter, as known, is obtained by the action of formaldehyde on gelatin, and in the opinion of the exploiters of these tablets contains so little formaldehyde that it exerts no prohibitive physiological or therapeutic action. These tablets are characterized by disintegrating with extreme rapidity in contact with water and, as determined experimentally, also with fluids having the composition of the juices of the stomach, so that the rapid dissemination of the medicament incorporated with it is assured. The rapid disintegration of these tablets is shown by moistening, for example, one medicated with acetylsalicylic acid with a drop of water. The moistened surface immediately swells tumor-like, and if thrown into water the tablet completely disintegrates into minute particles in from 3 to 5 seconds. Under circumstances the base of the tablet may be partly composed of starch and talc. The tablets may also be made enteric by a coating of insoluble gelatine, which is soluble only when in contact with alkaline fluids, hence do not disintegrate until they reach the intestinal tract.—Pharm. Ztg. lv (1910), No. 4, 37.

Glutubes are capsules prepared from gluten flour in a manner similar to gelatin capsules which they resemble in shape and general appearance. They are distinguished, however, in that they are insoluble in the juices of the stomach, becoming soluble on reaching the intestinal tract.—Pharm. Centralh., 51 (1910), No. 1, 4.

Gynin, a water-soluble antiseptic compound for vaginal treatment is said to be composed of sodium sulphophenate, alum, sodium chloride, tartaric acid, sodium borate, boric acid, and sozoiodol-sodium.—Pharm. Zentralh., 50 (1909), No. 52, 1082.

Hæmaformyl is the name given to a condensation product prepared by a patented method from the coloring matter of hæmatoxylin and formaldehyde. It is exploited as a new remedial specialty, recommended externally for the treatment of wounds, skin diseases, etc., of man; internally in the intestinal catarrhs and diarrhœas of domestic animals.—Pharm. Ztg., liv (1909), No. 100, 988.

Hectagyre is the coined name of a compound of mercury with hectine (which see).—Pharm. Ztg., liv (1909), No. 74, 727.

Hectine—A New Ammonium Derivative.—F. Balzer and A. Mounicyrat describe a new arsenium derivative—sodium benzosulpho-p-amino-phenyl arsenate—which they have named "hectine." It crystallizes in long well-formed needles, very soluble in water. The solutions are stable, and may be sterilized without decomposing. Hectine is less toxic than atoxyl. No ill effects have followed a two months' treatment, during which the total amount of the drug administered has amounted to 8 or 10 Gm. Yet hectine is more active in cases of syphilis in relatively smaller doses than

more poisonous arsenical compounds. When 20 Cgm. were administered hypodermically to a healthy subject, arsenic equivalent to 10 Cgm. was eliminated in the urine in the first twenty-four hours, and that equivalent to another 5 Cgm. in the following sixty hours, the rest was more slowly eliminated until the end of twenty-five days, when no more arsenic was found. In therapeutic doses hectine is therefore quickly eliminated. The dose may be as much as $\frac{3}{4}$ to 3 grains for an adult in twenty-four hours for a fortnight; a fortnight is then intermitted without treatment; then hectine is again administered. It is also given by the mouth in doses of $1\frac{1}{2}$ to 3 grains in twenty-four hours.—Pharm. Journ. and Pharmacist, Aug. 7, 1909, 205; from L'Union Pharm. 50, 1909, 308.

Iodarsotropin is a composite trade-name for tablets containing iodine, arsenic and belladonna.—Pharm. Zentralh., 50 (1909), No. 43, 869.

Iod-Neol is the name given to a stable iodine salve which is claimed to possess the advantage over iod-vasogen in containing iodine in a free state. It is brown-black, of a soft, emolient consistence and readily absorbed by the skin. According to Vogtherr it has the following chemical composition: Neutral fat, 9.98 per cent.; medicinal soap, 7.23 per cent.; lanolin, 46.29 per cent.; free iodine, 1.34 per cent.; sodium iodide, 1.55 per cent.; iodine in organic combination, 4.92 per cent.; water, 26.69 per cent.—Pharm. Ztg., liv (1909), No. 57, 558; from D. Med.-Ztg., 1909, No. 55.

Jecovol is the name given to an egg-emulsion of codliver oil, containing 50 per cent. of the oil, together with hypophosphites in a palatable form.—Pharm. Zentralh., 50 (1909), No. 43, 869.

Iodcallistan is a specialty composed of iodine and plant mucilage.—Pharm. Ztg., liv (1909), No. 68, 662.

Kolynos is the name given to a tooth paste having the following composition: Soap, 33.0; precipitated lime (*sic.*), 25.0; absolute alcohol, 20.0; glycerin, 15.0; benzoic acid, 3.0; eucalyptus oil, 2.0; peppermint oil, 2.0; saccharin, 0.5; thymol, 0.25. It has been experimentally examined by E. Walter, at the Hygienic Institute of the University of Greifswald, who reports favorably on its disinfectant action on diphtheria bacilli, streptococci and pneumococci, both in the reagent glass and under natural conditions.—Pharm. Ztg., liv (1909), No. 74, 727; from Z. Bl. f. Bakteriologie, etc., 51, No. 4.

Kossam is the name given to "tabloids" prepared from the oily seeds of *Brucea sumatrana*, which, according to Bertrand, contain a glucoside, "kossamin" (see also "Proceedings" 1909, 195). These tabloids are recommended in cases of amebic dysentery.—Pharm. Ztg., lv (1910), No. 46, 472; from Therap. d. Gegenw., 1910, No. 6.

La Giraucone is the name given by a Berlin manufacturer to a resinous

resorcin ointment, which is recommended in veterinary practice to promote the growth of horns.—Pharm. Ztg., lv (1910), No. 6, 59.

Lecipon is the trade name of a lecithin preparation, supplied in the form of a pleasant-tasting powder, soluble in water and alcohol. It contains 10.5 per cent. of ovolécithin.—Pharm. Zentralh., 50 (1909), No. 49, 1022.

Leurose is a new name for a proprietary meat solution made by Leube-Rosenthal's method.—Pharm. Ztg., liv (1909), No. 74, 727.

Liquor Paraffini-Kromayer is stated to be a simple mixture of 30 Gm. each of liquid paraffin, xylol and acetone.—Apoth. Ztg., xxiv (1909), No. 100, 942.

Loretin.—G. Mossler states that m-iodo-o-oxyquinoline-ana-sulphonic acid, which is chemically identical with loretin, is prepared as follows: *a*-quinoline-sulphonic acid is fused with alkali and so converted to *a*-oxyquinoline, which on sulphonation gives *a*-oxyquinoline-ana-sulphonic acid; this is neutralized with potash and heated with potassium iodide and chlorinated lime, and on then neutralizing with hydrochloric acid the calcium salt of m-iodo-o-oxyquinoline-ana-sulphonic acid separates as yellowish-red crystals, from which the free acid is obtained by the further action of hydrochloric acid. It forms a yellow crystalline powder, almost without smell or taste, soluble with difficulty in cold water (1 in 500) more readily in hot (1 in 70), but little soluble in alcohol, nearly insoluble in ether, chloroform, and fixed oils; the watery solution is of a strong yellow color, and acid reaction; it dissolves to a greater extent in aqueous alkalies, forming salts, these solutions being greenish-yellow and slightly fluorescent. It decomposes about 250° to 270° C. with loss of iodine.—Pharm. Journ. and Pharmacist, May 28, 1910, 677; from Ztschr. Allgem. Oesterr. Apoth.-Ver., April 2, 1910, 141.

Mensan is the name given to a hazelnut preparation which is recommended as a hæmostatic. It is prepared from hazelnuts deprived of oil, and is supplied in the form of a sweet, alcoholic fluid, representing 125 Gm. of the fruits in a tablespoonful (= 15 Cc.)—Pharm. Ztg., liv (1909) No. 98, 969; from Münch. Med. Wschr., 1909, No. 48.

Muscusan, a non-corrosive bacterial antiseptic, is stated to be "diborzin-diorthoxybenzoate."—Pharm. Ztg., lv (1910), No. 25, 253.

Neoferrol is the name of a liquid saccharate of iron and manganese containing lecithin.—Pharm. Zentralh., 1910, No. 19, 382.

Neutralon is the name given to aluminum silicate which is recommended in stomach affections on account of its property of combining with large quantities of hydrochloric acid, with formation of aluminum chloride and liberation of silicic acid. It is supplied in form of a solution, strength not stated, which is given in tablespoonful doses three times daily.—Pharm. Zentralh., 50 (1909), No. 49, 1022; from Berl. Klin. Wchschr. 1909, 2165.

Neo-Pyrenol is the name of a specialty having marked expectorant properties, in addition to sedative, antirheumatic and antifebrile effects. The expectorant factor consists of thymol which is rendered water-soluble by means of paradioxy-benzol and with which by a special method a certain amount of Siam benzoic acid (? Rep.) is incorporated. The addition of equal parts of sodium benzoate and sodium oxy-benzoate to four parts of the product of reaction constitutes the "neo-pyrenol." The process of rendering the thymol water-soluble is protected by a German patent.—Pharm. Ztg., liv (1909), No. 73, 715; from D. Aerzte Ztg., 1909, No. 17.

Neopyrin is the name given by its exploiters to "valerylamidoantipyrine," which is supplied in form of nearly odorless white crystals, having a bitter (quinine-like) taste. It is neutral in reaction, melts at 203° C., and is difficultly soluble in water, cold or hot. On boiling with alkali and treatment with diluted acids, neopyrin splits into amido antipyrine and valeric acid. It is readily soluble in methyl alcohol, chloroform, and warm 50 per-cent. alcohol. A bromine compound—

Bromovalerylamidoantipyrine is also described. It forms colorless and tasteless shining scales, having a faint bitter taste, and melting with decomposition at 206° C.; is sparingly soluble in water, cold ethyl alcohol, ether or benzol, but more soluble in hot ethyl alcohol; contains 21.85 per cent. of bromine, and forms well-crystallized salts with acids.—Pharm. Ztg., liv (1909), No. 92, 909; from Therap. Monatsh., 1909, No. 11.

Novocol is the name given to the sodium salt of monoguaiacol phosphoric acid. It is readily soluble in water, has an agreeable taste, and is recommended in the first stages of tuberculosis, in chronic bronchitis, in whooping cough, etc.—Pharm. Ztg., lv (1910), No. 21, 213.

Novoiodin is the name given to a new wound-antiseptic, is said to be composed of equal parts of hexamethylenetramin diiodide and talc. It is supplied in form of a loose, light brown, perfectly odorless powder of impalpably fine and amorphous structure. It is practically insoluble in nearly all solvents, but is easily suspended in olive oil, liquid paraffin, glycerin and collodion up to 20 per cent., depositing from these suspensions very slowly. Its activity manifests itself in contact with wound secretions or certain chemical agents by splitting up into iodine and formaldehyde (32 per cent. and 20 per cent. respectively). It is decomposed at 100° C., and sterilization cannot therefore be effected above 80° C.—Pharm. Ztg., lv (1910), No. 13, 128; from Zschr. d. Allgem. Oesterr. Apoth.-Ver., 1910, No. 6.

Ossiostose is the trade name for a phosphate of lime milk.—Pharm. Ztg., liv (1909), No. 74, 727.

Ovaradentriferrin is the name given to tablets containing 0.3 Gm. ovaraden (?) and 0.19 Gm. triferrin, which are recommended for the treat-

ment of various female diseases in doses of two tablets daily.—Pharm. Zentralh., 50 (1909), No. 49, 1022.

Ozin is the name given to a salt or saline mixture which is recommended for the convenient generation of oxygen in a special apparatus for inhalations. The principal component is said to be sodium perborate ($\text{HBO}_2 - 4\text{H}_2\text{O}_2$), containing 13 per cent. of available oxygen, which is liberated by the action of an iodide (NaI or KI).—Pharm. Ztg., lv (1910), No. 40, 409; from Ztschr. d. Allgem. Oesterr. Apoth.-Ver., 1910, No. 19.

Pergenol is the name given to a mixture of sodium perborate and sodium bitartrate in molecular proportions, supplied in the form of a crystalline powder having a faint boric acid reaction. It possesses indefinite stability in the dry state, but when dissolved in water it is split up into hydrogen dioxide, boric acid and neutral sodium tartrate, the last two uniting to form sodium borotartrate. The preparation is also designated as "solid hydrogen peroxide."—Pharm. Ztg., liv (1909), No. 61, 594.

Peristaltin is the name given to a new mild purgative specialty obtained from cascara sagrada, which has so far however been used only in veterinary practice. It is claimed to be a water-soluble glucoside of the composition $\text{C}_{18}\text{H}_{18}\text{O}_8$, and does not belong to the anthracene group of bodies to which emodin, etc., belong, but is quite distinct from them. It is readily soluble in water and diluted alcohol, sparingly soluble in alcohol, and insoluble in benzol, ether, and petrolatum ether. The aqueous solution reacts faintly acid and reduces Fehlings' solution when heated with it; is not precipitated from its aqueous solution by lead subacetate, and does not produce with Borntrager's test a red, but a colorless or faint straw yellow ammonia solution. Sulphuric acid dissolves it with a brown color.—Pharm. Ztg., lv (1910), No. 6, 59; from Therap. Monatsh., 1910, No. 1.

Phymochrom (Thymochrom) is the name given to an arsenic compound of the "thymusgland," a specialty recommended for internal use in skin diseases.—Pharm. Ztg., liv (1909), No. 68, 662.

Pitral is the name given to the neutral fraction of coniferous wood tar, possessing the medicinal properties of the latter and devoid of unpleasant side effects.—Pharm. Zentralh., 50 (1909), No. 49, 1022; from Dermatol. Zentralbl., Sept., 1909.

Plasmase, a specialty exploited as a tonic in veterinary practice, has been examined by Fromme who finds it to be composed of arsenic in organic combination (probably atoxyl), sodium, phosphoric acid, traces of chlorine, cresols, glycerin, water, and undetermined organic substances. Albumen which has been named as a constituent, could not be detected.—Pharm. Ztg., lv (1910), No. 22, 225; from Berl. Thierärztl. Wschr., 1910, No. 10.

Pneumocol is the trade-name given to "Sirupus aromaticus sulfokreosoto-guaiacolicus."—Pharm. Ztg., liv (1909), No. 74, 727.

Porcidin is the name given to a new lymph recommended for the treatment of the swine-plague, which is prepared according to directions given by veterinary surgeon Körner.—Pharm. Ztg. lv (1910), No. 36, 368.

Propyron is the trade-name given to sodium thymico-oxybenzoicum.—Pharm. Zentralh. 50 (1909), No. 43, 869.

Puamambra is the name given to a new aphrodisiac specialty which is said to be composed of ambergris, mentholmethylester, yohimbin, Muira Puama, and calcium glycerophosphate.—Pharm. Ztg., lv (1910), No. 15, 147; from Münch. Med. Wschr. 1910, No. 7.

Periodal is the trade name given to a sarsaparilla syrup containing sodium iodide.—Pharm. Ztg., liv (1909), No. 74, 727.

Pyrolin is the name given to a disinfectant which is said to be a basic magnesium salt, obtained by the addition of magnesia to pyroligneous acid.—Pharm. Ztg., lv (1910), No. 33; from Pharm. Post, 1910, 243.

Radiogenol is the name given to an emulsion of an insoluble radium substance which is supplied in the form of ampuls and is recommended for the subcutaneous treatment of tumors, etc.—Pharm. Zentralh., 50 (1909), No. 52, 1082.

Respiratin, a patented Japanese specialty recommended for asthma, has been examined by R. Ishizu, who finds it to consist exclusively of acid potassium guaiacolate in very impure condition. On the other hand, Yakugakwzasshi finds that a "Respiratin" occurring on the market is simply a mixture of 1 part of acid potassium guaiacolate with 99 parts of milksugar.—Pharm. Ztg., lv (1910), No. 24, 245; from Journ. Pharm. Soc. Japan, 1910, 73.

Rimosin Salve is the name given to an ointment recommended by its exploiters for the treatment of eczematous affections, which is stated to be composed of boric acid, lead acetate, mercury, zinc oxide, woolfat, simple ointment, vasoliment and benzoin. Its effectiveness is increased by the simultaneous administration of "rimosin tea," the composition of which is not indicated.—Pharm. Ztg., lv (1909), No. 92, 909.

Robylan (lecithin-iron pastilles) is said to contain 10 per cent. lecithalbumen and 6 per cent. organic iron.—Pharm. Ztg., liv (1909), No. 68, 662.

Salossit is the name given to an organic phosphorus compound with calcium and magnesium.—Pharm. Zentralh. 50 (1909), No. 43, 869.

Santyl-Knoll is now supplied in the form of tablets, each containing 0.4 Gm. santyl (see Proceedings 1906, 706) and 0.4 Gm. magnesium carbonate—the addition of the latter giving to the preparation a mild laxative property.—Ph. Ztg., liv (1909), No. 80, 793.

Sarton is the name given to a nutrient specialty for diabetics, prepared from soja beans by a method which eliminates nearly all of the carbohy-

drates and the unpleasant tasting components of the beans. It is supplied both in form of a thick puree (containing 18-19 per cent. of dry substance of which 8-9 per cent. is albumen) and, latterly in the form of a dry powder.—Pharm. Ztg., lv (1910), No. 30, 205; from Therap. der Gegenw., 1910, No. 4.

Sepdelen Tablets, recommended for the treatment of chronic ailments, particularly of females, are said to be composed of sodium citrate, 40, sodium tartrate, 30, sodium phosphate, 10, and sodium sulphate, 20 parts.—Pharm. Ztg., lv (1910), No. 40, 409.

Serasonol, a specialty exploited as an antisymphilitic remedy is said to be a soluble mercurio-arsenic compound.—Pharm. Ztg., lv (1910), No. 44, 449.

Solitania is the name given to a tæniifuge, essentially composed of a bitterless extract of pomegranate bark, castor oil, and aromatic saccharated cacao. It is supplied in form of a brown, aromatic, chocolate-like powder, contains no male fern, and is claimed to be an effective tæniifuge, free from the toxic and nauseating properties of the ordinary extract of pomegranate bark.—Pharm. Ztg., lv (1910), No. 25, 253.

"*Spritol*" is the name given by its exploiters to a substitute for alcohol which, it is claimed, is an absolutely new chemical compound and while containing neither methyl, amyl or ethyl compound of the familiar group of alcohols, replaces ethyl alcohol for all purposes except for internal consumption. It is described as a colorless, mobile fluid, having a faint but peculiar odor, and burning with a non-luminous flame, leaving no residue. It goes without saying that the method of its production is withheld as inviolate as is the chemical nature of this mysterious compound.—Pharm. Ztg., liv (1909), No. 81, 799.

Stilligol is a specialty recommended for gall-stone, which is supplied both in form of an ointment and as a mixture for internal use. The ointment contains oil of lavender and oil of lemon; the mixture is composed of glycerin extractions of rhubarb, cascara sagrada and various inactive drugs.—Pharm. Ztg., lv (1910), No. 22, 225.

Subacetol is the name given by its exploiters to a preparation intended for the convenient production of "Burow's Solution" (Liquor Burowii)—15.0 Gm. corresponding to the dry substance in 500 Gm. of the solution, which is usually prepared with 25 Gm. solution of basic lead acetate, 5.0 Gm. alum. crud. and 500 Gm. distilled water. Subacetol is a dry, whitish powder.—Ztschr. d. Allgem. Oesterr. Apoth. Ver., 1910, No. 10.

Subcutin is the name given to the phenolsulphonate of *anæsthesin* (which see in Proceedings, 1902, 788), which is recommended as a powerful local anæsthetic and disinfectant, practically free from toxic by-effects. It is obtained by the reaction of equivalent quantities of anæsthesin hydrochloride and p-phenolsulphonate of potassium, forming a white, odorless, crystalline powder of the melting point 195° C. It dissolves in cold water to

the amount of 4 per cent., but is completely and readily soluble in alcohol, and to the amount of 10 or 15 per cent. in a mixture of equal parts of glycerin and alcohol—the latter solution being particularly serviceable for penciling tuberculous ulcers.—Pharm. Ztg., liv (1909), No. 81, 797.

Sublimate Ampouls are suggested by Abry in place of the well-known sublimate pastilles for making antiseptic solutions, prepared by the following formula: Mercuric chloride, 12.0; sodium chloride, 12.0; copper sulphate, 2.4; hydrochloric acid, 2.4; carmine. q. s; water, q. s. to make 24 ampoules, each containing 2 Cc. The addition of copper sulphate and hydrochloric acid serves particularly and well as a deodorant for wounds.—Pharm. Ztg., liv (1909), No. 85, 839; from Journ. de Pharm. d'Anvers, 1909, No. 18.

Substitol is the name given to dry fibrin which is obtained from the fresh uncoagulated blood of healthy animals, particularly horses, by a special method and vigorous observance of antiseptic precautions, and without the use of chemical agents. By the method employed, the red corpuscles are removed on the one hand, the serum ("Aftermol," which see) on the other, and the product is reduced to dryness, at a temperature which does not destroy the active ferments, and then powdered. Substitol is free from germs and may be sterilized without decomposition.—Pharm. Ztg., liv (1909), No. 68, 662.

Susol is the name given to a specialty containing iodine in combination with a beech-tar preparation dissolved in oil, which is recommended in veterinary practice as a bactericide.—Pharm. Ztg., liv (1909), No. 74, 727.

Sydrosan is the name given to an Austrian specialty composed of powdered eucalyptus leaves and flowers, washed sulphur, linden charcoal, oil of melissa, oil of eucalyptus globulus and oil of eucalyptus maculatus var. citriodorus.—Pharm. Zentralh., 50 (1909), No. 43, 869.

Tabulettæ Arthriticae-Simon, a specialty containing, besides quinic acid and citric acid, 0.001 Gm. colchicine in each tabule.—Pharm. Ztg., liv (1909), No. 68, 662.

Theolactin.—According to G. Mossler, the compound of theobromine-sodium and sodium lactate, chemically identical with theolactin, is obtained on dissolving eighteen parts of theobromine in the equivalent quantity of caustic soda, adding to a solution of 11.2 parts of sodium lactate in water, and evaporating the mixture to dryness. It forms a white, odorless, hygroscopic powder, having a bitter taste; fairly easily soluble in cold water (1 in 16), more easily in hot, soluble with difficulty in alcohol, almost insoluble in ether and chloroform; the watery solution is alkaline in reaction. The compound should be kept in a well-closed bottle, as otherwise the carbon dioxide of the air liberates theobromine, and the solubility is consequently diminished.—Pharm. Journ. and Pharmacist, Nov. 28, 1910, 677; from Ztschr. Allgem. Oesterr. Apoth.-Ver., April, 1910, 150.

Thilaven is the name given to a specialty exploited for the preparation of agreeably odorous sulphur baths and consists, according to Dr. H. Erdmann, of *Linalyl acetatethiozonide* (obtained by the action of sulphur on lavender oil) and *Alkali thiozonate* (obtained by the action of sodium sulphide on sulphur) in alcoholic solution.—Pharm. Zentralh., 51 (1910), No. 8, 157.

Tranquillitum is the name of an ointment containing hyoscyamine, aconitine, methol camphor, chloral camphor, and salicyl derivatives.—Pharm. Ztg., liv (1909), No. 74, 727.

Tuberkinin Pills contain old-tuberculin Koch, quinine and cresote carbonate.—Pharm. Zentralh., 50 (1909), No. 43, 869.

Tuberkulosan is the name given to a bacteria preparation recommended as a remedy in the tuberculosis of neat cattle, but which is claimed also to have proven effective in the treatment of tuberculosis in humans.—Pharm. Ztg., liv (1909), No. 92, 909.

Tubertoxyl-Durodenal Capsules contain old-Tuberculin Koch, Atoxyl and creosote carbonate.—Pharm. Ztg. liv (1909), No. 74, 727.

Tyramine is the name given to tablets containing 0.005 Gm. of oxyphenylaethylamine, which are supplied in this convenient form for preparing injections.—Pharm. Ztg., lv (1910), No. 30, 305; from Bull. des Scien. Pharmacol., 1910, 177.

Vasotonin is a specialty consisting of "yohimbine nitrate-urethan, which is claimed to be a definite compound having the melting point 260°-261°, and readily soluble in water. It is supplied in ampuls containing about 1.2 Cc. of liquid 1 Cc. containing 0.06 Gm. vasotonin, representing 0.01 Gm. yohimbine Schweiz. Wschr. f. Chem. u. Pharm. xlviii (1910), No. 21, 330.

Weiss-Neurolin is the name given to tablets containing 2 per cent. Nutrient salts, 3 per cent. Peroxides and 4 per cent. Iron.—Pharm Zentralh., 50 (1909), No. 36, 749.

Xerase is the name given to a new yeast preparation, exploited for the treatment of colpitis and erosions of gonorrhoeic and non-gonorrhoeic character, profusely suppurating wounds, inoperable carcinoma, ulcera cruris, etc. It is stated to be composed of chemically pure dried yeast (150), bolus (125), sugar, (20) and nutrient salts (3), and is supplied in bulk (100 Gm. bottles) and in form of elastic capsules (each 3.0 Gm.).—Pharm. Ztg., lv (1910), No. 8, 79.

Zincochinol is a specialty obtained by saturating oxychinolinsulphonic acid with zinc oxide or zinc carbonate, in form of a bulky yellow powder, nearly insoluble in water. In round numbers it contains 20 per cent. of zinc oxide and 80 per cent. of oxychinolinsulphonic acid.—Pharm. Zentralh., 50 (1909), No. 33, 686.

Zinkopyrine is a double salt composed of 1 mol. zinc chloride and 2 mol. phenyldimethylpyrazolon, and is recommended to replace pure zinc chloride as being less irritant, and consequently less toxic than the latter. Pharm. Ztg., lv (1910), No. 12, 121.

MATERIA MEDICA.

GENERAL SUBJECTS.

The Pharmacognosy of the U. S. P. is the title of an exhaustive and scholarly paper by Henry Kraemer in which he discusses the subject in its application to the U. S. as well as foreign pharmacopœias and to commercial drugs, with particular reference to the forthcoming revision leading to the U. S. P. IX. He points out that pharmacognosy is a science of fundamental importance to the pharmacist, and that the results of the studies in pharmacognosy are of the greatest value to the physician in assuring him uniform and efficient medicines; that foreign pharmacopœias, which give more uniform consideration to the various subjects, are as strong in their treatment of pharmacognosy as is that of chemistry and pharmacy; but that the pharmacognosy of the U. S. P. has not been thoroughly revised for a decade or more, and that the existing needs demand that it shall be completely modernized. The work of the next subcommittee on pharmacognosy will therefore be an extensive one, and a wide co-operation is desirable.—Amer. Journ. Pharm. Febr. 1910, 51-61.

Importation of Drugs—Supervision and Inspection.—George W. Hoover, of the U. S. Department of Agriculture, contributed a highly interesting paper at the April meeting of the Philadelphia Branch of the Association, designed to give a general idea of the inspection of imported drugs under the Food and Drugs Act, and to indicate some of the conditions of the enforcement of the law, and the changes and tendencies of conditions up to the present time. There are at present twenty-one working branches of the Bureau of Chemistry distributed throughout the United States. The function of such laboratories is to inspect imported and domestic foods and drug products and to do such work along the lines of investigation as may assist in the enforcement of the Federal Act. Six of these laboratories were in operation prior to the passage of the Act, but were actively engaged only in the inspection of imported food products, drugs not receiving any consideration until the summer of 1907. Since then it is interesting to note the changes which have taken place both as to quality and labeling of various products which are imported into the United States. As regards the crude drugs, with the progress of the work it became noticeable that there was decided improvement in quality, and that many of the old-time violations no longer obtain. In a number of cases it has been represented that it was difficult to control the gathering

or collection of certain commodities because of the character of the labor and nature of the material, but this contention is apparently not well founded, because numerous importations of such goods are being offered which are found satisfactory. While there is no doubt that a certain small per cent. oppose the proper enforcement of the law and apparently do much to defeat its purpose, it is gratifying to know that the vast majority of importers, manufacturers and dealers have co-operated faithfully in its enforcement.—*Amer. Journ. Pharm.*, July, 1909, 336-342.

Mexican Medicine—Historical Notes.—J. F. Lewellyn read a very interesting paper at the 1909 meeting of the Missouri Pharmaceutical Association, in which he gave brief notes on a large number of historical facts connected with the native Mexican practice of medicine, which cannot, however, be profitably condensed, and must therefore be consulted in the original paper in *Proc. Mo. Pharm. Assoc.*, 1909, 105-107.

The Chinese Materia Medica of San Francisco is the subject of some interesting "notes" by Albert Schneider, which appear in the "Proceedings," 1909, 852-858.

The Materia Medica of Perak is the title of a highly interesting contribution by E. M. Holmes, curator of the Museum of the Pharmaceutical Society of Great Britain, and an honorary member of this Association, which is published in the "Proceedings," 1909, 752-765.

Drugs—Valuation by Bio-Chemical Tests.—Introducing the subject of his experience in the testing of drugs by bio-chemical methods, Dr. Wm. Martin observes that the question of testing by physiological methods some drugs whose activity cannot at present be appraised by chemical means is one that has engaged the attention of manufacturing pharmacists for some years, and was first applied systematically for commercial purposes by manufacturers in America. Selecting for his topics the value of the application of bio-chemical tests to cannabis indica, ergot, epinephrine, digitalis, squill and strophanthus, he gives details of his experience and the methods which he has found most practicable, showing, for example, that by the aid of physiological methods of testing a fluidextract of ergot more active than the official preparation can be produced. The valuation of the cardiac tonics, digitalis, squill, and strophanthus—also becomes possible by bio-chemical methods described, such researches affording to pharmacists an inducement to display yet greater care in the selection and storage of his crude drugs, and the making, keeping, and improvement of preparations from them. With regard to the idea, which seems to be gaining ground, that some tests of a bio-chemical nature should be included in the Pharmacopœia, it is Dr. Martin's impression that the time is not yet ripe for the introduction of tests of this kind, unless, indeed, they were made permissive and not mandatory. Nevertheless, if it were decided that the "frog test" was the most generally satisfactory method of estimating the therapeutic activity of the cardiac

drugs, he thinks it could be included without departure from the principles that have hitherto actuated the compilers of the Pharmacopœia, not to include methods that could not be carried out by the pharmacist himself, inasmuch as these tests are of such a kind that they could be carried out quite well, and with perfect propriety, by men who are trained in the art of delicate manipulation and scientific observation.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 239-254.

Physiological Standardization—Its Value and Limitations.—Dr. Horatio C. Wood, Jr., contributes an interesting paper on physiological standardization, addressed particularly to those weighing the advisability of introducing biological tests into their business and who wish to know the likelihood of the innovations paying, in which he brings forward some facts that may serve as an aid in deciding whether the biological assay is of sufficient value to justify the expense involved. Speaking of its limitations, he considers it absurd to think of controlling the results of a chemical assay by physiological tests. The experienced chemist can obtain accurate results because he knows the common sources of error which are likely to vitiate his conclusions and how to guard against them. In biological assay we know only a few of the possible causes of inaccuracy, and even some of these we cannot exclude; and believing, as he does, that the biological assay is less accurate, more difficult, and often more costly, he cannot see how it can hope to compete with the chemical as a routine means of standardization. But when we recall that there are over a hundred crude vegetable drugs, including some of our most potent poisons, recognized by the Pharmacopœia, for which we have no official process of assay, it is evident that there is need for a subsidiary method of determining the comparative activity of our materia medica. Some of these will doubtless be provided with chemical assay tests, while others, unsuited for such, should lend themselves comparatively readily to the physiological assay, particularly the more potent ones, such as digitalis, squill, apocynum, aspidium, cannabis indica, ergot, etc., with which substantial progress has been made on biological lines. The author cautions, however, against accepting the claims of manufacturers regarding the physiological standardization of their products without question. Much of this work is probably being done by young men who have not sufficient training in methods of biological assay, and those who have the necessary qualifications and training can hardly be expected to relinquish comfortable occupations in pleasant surroundings and with a fair emolument, for one more or less dependent, in the drug laboratories, unless inducements are offered that are much better than is at present the case. While the number of drugs which require biological assay may seem at first thought too small to justify the outlay necessary to obtain a man competent to do the work, there are so many other ways in which a pharmacologist may make himself valuable, that there is at least a strong possibility of such an expert being a paying in-

vestment. How, in the author's opinion, it may be brought about that pharmacists may share in this work is very lucidly discussed in the concluding remarks of Dr. Wood's admirable paper, which appears in the *Amer. Jour. Pharm.*, March, 1910, 101-112.

The Pharmacological Assay of Heart-Tonics by E. M. Houghton and H. C. Hamilton, is very interesting. This very comprehensive paper contains numerous charts explaining the action of such well-known heart tonics as digitalis, strophanthus, and squill, and the preparations made from them.—*Ibid.*, p. 773-786.

Assayed Products.—The question of how much deviation from legal standards for assayed products should be allowed by Boards of Pharmacy is discussed in a paper printed in the "Proceedings" 1909, 745-746.

Crude Vegetable Drugs—Valuation on the Basis of Extraction.—Dr. Kunze contributes an interesting paper on the examination and valuation of drugs based on the percentage of extract yielded with the solvents directed for the preparation of tinctures, extracts, wines, etc. Using the respective drugs in air-dry condition, he obtained the following percentages of dry extract: Cortex cascara sagrada, 25.8 to 28.5 per cent.; cortex chinæ (G. P.), 30 per cent.; cortex condurango, 17.5 and 18.3 per cent.; cortex viburni prunifol., 22.8 per cent.; herba thymi, 14.2, 16.7 and 16.8 per cent.; rad. valerianæ, 10.3 per cent.; rhizoma hydrastis, 19.5 to 22.3 per cent.; secale cornutum, 15.7 to 18.6 per cent. The author also records the results obtained by the determination of the extract, specific gravity, etc., in a number of fluidextracts and wines. Regarding the assay of cinchona bark, he points out the importance of specifying and following accurately the described process of determining the alkaloid, the same sample of bark giving different results, depending on the method and variation from the same. In the case of ergot, the author considers it important that the cornutine content be determined according to a fixed standard and reliable method.—*Pharm. Ztg.*, lv (1910), No. 16, 158.

Referring to Dr. Kunze's observations on the valuation of crude vegetable drugs and their preparations, L. Derlin questions the reliability of a valuation on the basis of the dry extract. Not only that the drug itself varies in the amount of extractive in different samples, but the preparations themselves will show variations due to the formation of deposits on keeping. Taking hydrastis, for example, he has found in 13 of his own preparations variations up to 16 per cent. Further, to ascertain the depreciation, if any, in extractive, he set aside three fluidextracts under identical conditions and examined them after 6 and 12 months, when they showed the following reductions in extract:

No. 1 from 18.58 per cent. to 17.85 per cent.....	4.5 per cent.
No. 2 from 21.88 per cent. to 18.2 per cent.....	= 17 per cent.
No. 3 from 24.4 per cent. to 21.1 per cent.....	= 13.5 per cent.

The author also calls attention to the fact that the alkaloidal content

does not necessarily correspond to the amount of extract, and he demonstrates this experimentally.—Pharm. Ztg., lv (1910), No. 24, 244.

Drugs—Moisture and Ash.—The importance of moisture and ash determinations in vegetable drugs is gaining ground from year to year with the issue of new pharmacopœias, W. Peters has made and reports a number of such determinations in the hope that his results may give the incentive for similar determinations by other experimenters. Selecting drugs of assured quality and identity, the moisture was determined in average samples by drying to constant weight, followed by the determination of ash, the ash content of the air-dry drug being then ascertained by calculation. The ash determination was made with 1–2 Gm. of the powdered drug carefully prepared so as to represent the entire drug. This was slowly reduced to ash in an open platinum crucible, heated in a slanting position by means of a small flame, frequently stirring with a platinum wire until the reduction was completed, and carefully avoiding a temperature sufficiently high to melt the ash, which might prevent complete incineration by inclosing unconsumed particles of carbon. The results are given in the form of a table, describing the condition of the drug (whole, coarse or fine powder), the amount of moisture, the ash calculated on the air-dried drug, the ash actually found in the dry drug, and the color of the ash. The drugs so examined were the following: Bulbus Scillae, Cantharides, Cort. Chinae Succirubra, Cort. Granati, Flor. Cinae, Fol. Belladonnae, Fol. Coca, Fol. Digitalis, Fol. Hyoscyami, Fol. Jaborandi, Fol. Stramonii, Placenta Sem.-Lini, Rad. Angelicae, Rad. Gentianae, Rad. Ipecacuanhae, Rad. Levistici, Rad. Liquiritiae, Rad. Pimpinellae, Rad. Sarsaparillae, Rad. Valerianae, Rad. Rhei, Sem. Strychni, and Tragacantha.—Apoth. Ztg., xxiv (1909), No. 59, 537–538.

Purity of Some Official and Non-Official Drugs and Chemicals is the subject of a lengthy paper by A. R. L. Dohme and H. Engelhardt, which appears in the "Proceedings" of 1909 (p. 713–719) in which reference is made to a large number of drugs on the market which fail to respond to the official requirements or do not respond to proper commercial standards.

Adulterated Drugs—Frequent Occurrence on the American Market.—L. Rosenthaler, reviewing the recent paper of Dr. H. H. Rusby "On the Crude and Powdered Drugs at the Port of New York during the year 1907–1908" (see Proceedings 1908, 783), observes that it is remarkable that under the stringent customs regulations prevailing in the United States it should become possible for such grossly adulterated drugs from abroad, as are mentioned by Dr. Rusby, to make their appearance so frequently on the open market. Adulterated drugs are rarely offered on the German market, this immunity being doubtless due to the conscientiousness of the jobbing trade. At the same time, the author recommends as the surest safeguard against inferiorities and adulterations, the scrupulous examination of the drugs by the pharmacists themselves, and the

peremptory rejection by them of all drugs that fail to reach the accepted standard of purity and quality.—Pharm. Ztg., liv (1909), No. 61, 594.

Spices and Aromatic Drugs—Determination of Volatile Oil and Moisture.—R. A. Cripps and J. A. Brown describe a method for the determination of moisture in spices and aromatic drugs which is based upon the action of aqueous vapor upon calcium carbide, and measuring the acetylene produced. Half a gramme of the spice or drug, in fine powder, is introduced into a stout tube, 5 in. long and $\frac{5}{8}$ in. internal diameter; dried sand is then added to a depth of about $\frac{3}{4}$ in., and then calcium carbide, in moderately large pieces, to within $1\frac{1}{2}$ in. of the mouth of the tube, which is connected with a CaCl₂ tube, and this with a nitrometer filled with brine. The tube containing the spice is immersed in a brine bath to the upper level of the carbide, and after the apparatus has been adjusted at atmospheric pressure, heat is gradually applied to the bath, which is finally boiled until the volume of gas in the nitrometer ceases to increase during five minutes. The bath is then removed, and the apparatus allowed to cool. The number of Cc. of gas, after correction for pressure and temperature, multiplied by 0.001725, gives the weight of water in the quantity of spice taken. Total volatile matter is determined by heating the spice contained in a tube in an air-bath at 135° C., whilst a current of dry air is aspirated. Volatile matter is removed thus in an hour or less. The difference between the moisture and the total volatile matter gives the figure for the essential oil. The method is considered by the authors to be extremely well suited for gum-resins, oleo-resins, and balsams.—Pharm. Journ. and Pharmacist, Jan. 8, 1910, 27; from Analyst, Dec. 1909, 519.

Ground Spices—Method of Sampling for Examinations.—Harry E. Sindall gives some specific directions for sampling the different spices, a subject of considerable interest to the food chemist. It is well known that the spices as imported contain considerable foreign matter, mostly pebbles and sand, the removal of which is difficult to the miller. Another point to bear in mind is that some spices after being ground have a tendency to separate in layers, depending upon the differences in specific gravity of the particles. How to obtain fair samples of such spices as pepper, cinnamon, ginger, capsicum, is described in some detail in the author's paper, which may be consulted in the Amer. Journ. Phar., Febr., 1910, 80–82.

Botanical Nomenclature.—In the "Proceedings" of 1909 (pp. 673–677) an interesting paper by H. H. Rusby, M. D., on the "Rules of Botanical Nomenclature," in which he advocates its simplification and avoidance of a duplication of terms applied to different plants, and suggests certain safeguards to avoid misunderstanding.

The Botanical Nomenclature of the U. S. P.—Miss Alice Henkel, a worker in the Bureau of Plant Industry, contributes a paper upon the

subject of some desirable changes in the botanical nomenclature of the Pharmacopœia, which appears in the "Proceedings," 1909, 766-768.

Botany in the Colleges of Pharmacy.—In the "Proceedings" of 1909 (pp. 677-682) appears a paper by Albert Schneider, in which he lucidly presents his views on teaching botany in the colleges of pharmacy, which elicited an animated discussion, participated in by Messrs. Searby, Remington, Whelpley, Wilbert, Kebler and others (see pp. 682-686).

Drug Culture.—At the Los Angeles meeting of the Association a number of papers dealing with the cultivation of drugs were presented and discussed. These, as they appear in the "Proceedings," 1909, are here briefly mentioned by their titles and authority, and constitute a symposium on a subject which, in consideration of the increasing demand and correspondingly increasing scarcity, has awakened wide interest. The page numbers follow the titles of these papers for convenient reference:

Cascara Sagrada: Cultivation.—R. H. True and G. F. Klugh, p. 824-825.

Drug Plants: Breeding.—Rodney H. True, p. 827-830.

Belladonna: Culture in the United States.—Albert Schneider, p. 833-843 and p. 1167-1169.

Cannabis Indica: American Grown.—R. H. True and G. F. Klugh, p. 843-844.

Medicinal Plants of North America—Botanical and Morphological Description.—Theo. Holm continues his botanical and morphological description of North American medicinal plants, annually contributed since 1907. The following papers, accompanied by excellent illustrations have appeared in Merck's Report during the year covered by this report:

Euonymus Americanus, L., and *E. Atropurpureus*, Jacq.—(Both known under the name of "Wahoo," the first also commonly named "Strawberry Bush," while the second, which is official in the U. S. P., is also popularly known as "Burning Bush"), appears in the July number, 1909, 169-171.

Liriodendron Tulipifera, L.—(Two varieties are known and distinguished by the color of the wood, the one as "White Poplar," the other as "Yellow Poplar"), in the August number, 1909, 199-201.

Diospyros Virginiana, L.—(Persimmon, Date Plum, Yellow Plum, Winter Plum, Guaiacan, Seeded Plum, Pishmin, etc.), in the September number, 1909, 229-231.

Sambucus Canadensis, L.—(Common Elder), in the October number, 1909, 259-262.

Prunus Serotina, Ehrh.—(*P. Virginiana*, Mill., not Linnæus, commonly known as Wild Cherry, Black-, Rum-, Whisky- or Cabinet-Cherry, etc.), in the November number, 1909, 287-290.

Cornus Florida, L.—(Dogwood, Flowering Dogwood, Common Dogwood, Boxtree, Florida Cornel, Monbacanimschi), in the December number, 1909, 318-321.

Quercus Alba, L.—(White Oak), in the January number, 1910, 2-4.

Aletris Farinosa, L.—(Star-grass, Colic-root, Mealy Starwort, Blazing

Star, Bitter Grass, Unicorn Root, Ague Root, Ague Grass, Star-root, Devil's-bit), in the February number, 1910, 33-35.

Agropyrum Repens, (L.) Beauv. (couch-grass, quick-grass, quitch, dog-grass, Scotch-grass, witch-grass, quickens), in the March number, 1910, 55-68.

Rhus Toxicodendron, L. (poison ivy, poison oak), in the April number, 1910, 95-98.

Euphorbia Corollata, L. (blooming spurge, milk-purslain, white-pursely, Indian physic, purge-root, emetic-root, Bowman-root, snake's-milk, peheca, etc.), in the May number, 1910, 126-128.

Convallaria Majalis, L. (lily of the valley), in the June number, 1910, 100-162.

Dosage of Drugs—Inaccurate Estimation.—It is the usual custom in pharmacological work to state the dosage of drugs as so much per kilogram of body-weight of animal or man. Prof. Benj. Moore, however, points out that this method of stating dosage is inaccurate, the dose of a drug for two individuals of different size, apart from peculiar idiosyncrasies, being proportional, not to their weights, but to their *body surfaces*, in other words, to the two-thirds powers of their weights. Thus an adult of 150 lb. weight cannot be given fifteen times the dose for an infant of 10 lb., but much more nearly a dose only six times as much. It may be that it is this principle which limits the value of some drugs. Thus atoxyl will cure trypanosome infections in mice and rats, but in cattle, horses, and man, it is much less effectual. A rat of 140 Gm. weight can be safely given 0.02 Gm. of atoxyl. If the dose were proportionate to the body-weight, a man ought to be able to tolerate 10 Gm., but, as a matter of fact, about 1 Gm. is the maximum safe dose, which is in close correspondence to the two-thirds powers of the ratio of weights.—Pharm. Journ. and Pharmacist, Sept. 11, 1909, 342; from Biochem. Journ., iv, Nos. 5, 6 and 7, July, 1909.

Maximum Doses—Dispensing Difficulties: When these are Exceeded.—G. P. Forrester observes that the dispenser's attitude towards prescriptions calling for abnormal doses of potent drugs has recently been discussed in Great Britain, but none of those who have taken part in the consideration sufficiently noted the fact that other countries have foreseen the possibility of such occurrences and have established various regulations, usually embodied in the Pharmacopœia of the country, which place the pharmacist in a position to deal on a legal basis with such cases. Reference to the regulations of this kind in various countries shows how this dilemma is obviated, and the author explains how this becomes practicable by a brief review of the provisions of the Belgian, French, German, Swiss, Italian and Japanese Pharmacopœias. In this connection the author has appended a few of the maximum doses taken from the various Pharmacopœias mentioned, including the British. The first amount in each column is the maximum single dose, the second applies to the total amount permissible within twenty-four hours. All weights in grams:

molasses, while others are rising and sinking and a few float on or near the surface of the water. A unique activity is thus developed in this apparently lifeless matter, which is plainly due to chemical (fermentation) action, carbon dioxide and alcohol being formed. The resultant product of fermentation as supplied by a number of druggists at the period mentioned possessed a pleasant champagne-like taste, resembling certain French wines, and was found to contain from 4 to 6 per cent., or more, of alcohol. Dr. Kebler has recently endeavored to obtain some of this peculiar product, but failed, and it is evidently not now on the market. The question as to its origin, which has recently been frequently made to him, cannot therefore be answered until further information is available, the purpose of the present paper being to invite communications on the subject by persons having such additional information.—Pharm. Era, Dec. 16, 1909, 623.

"California Bees"—Probable Identity with "Japanese Beer Seeds."—Referring to Dr. Kebler's paper and inquiry concerning the origin and source of the so-called "California Bees," Prof. John Uri Lloyd observes that he has for many years been searching for a material, which within his knowledge, was used in Kentucky as far back as 1859 under the name of "Japanese Beer Seeds" for making a "home drink." These so-called "beer seeds" emanated from an Eastern establishment, as near as he can remember, and came dried, apparently much like some forms of tapioca, or disintegrated, dried pulp of rice, of a white color, and possessing essentially the fermentative properties of the article described by Dr. Kebler. Professor Lloyd evidently has no doubt of the identity of the two substances, the difference being only in name. As to the origin of this ferment, he gives it as his opinion that it must be looked for in the Orient, and that the original name, "Japanese Beer Seeds," will be found to correctly apply. That it is a ferment in the nature of yeast, he regards as evident.—Ibid., Febr., 1910, 123.

Ergot—Active Constituents to Date.—Prof. Wolfgang Heubner contributes an interesting enumeration of the constituents of ergot which have been isolated to the present day, with particular consideration of their pharmacological activity. Not less than three active constituents, exerting pronounced influence on the muscular system, have been isolated from ergot in a pure condition. Beside these there are a number of substances having the opposite effect, such as *ergotinic acid* (= secale-amidosulfonic acid) and probably some ammonium bases of the *choline*-type. Of inactive constituents, "*clavine*" (composed according to the most recent investigations of *leucine*, *isoleucine* and *valine*) and *ergotinine* are the most noteworthy; and particularly the last named, which approximates to the active constituents of ergot, and is distinguished only by a minus of H₂O from *ergotoxine*, were recognized as being the characteristic

toxic constituent of the fungus. *Ergotoxine* itself is amorphous, but yields several crystallizable salts, such as sulphate and phosphate, which are applicable for hypodermic injections. More recently, Barger and Dale have added to this list of active constituents, two others, having a pharmacologic activity resembling that of ergotoxine, but distinguished from this by their solubility and by being easily absorbed. These are respectively *isoamylamine* and *p-oxyphenylamine*—the latter, together with ergotoxine, determining the activity of ergot and its preparations, as well as the toxicity of the other constituents hitherto described as active. These must be regarded as impure products containing some of the true active constituents—usually ergotoxine—in admixture.—Pharm. Ztg., lv (1910), No. 4, 37; from Therap. Monatsh., 1909, No. 12.

Ergot—p-Hydroxyphenylethylamine One of the Active Constituents.—Dr. G. Barger's experiments demonstrated to his satisfaction that besides the alkaloid *ergotoxine*, which is only present in very small quantities, ergot contains a second active principle, which proves to be identical with *p-hydroxyphenylethylamine*, recently isolated by him in conjunction with Walpole, from putrid meat. The author expresses the opinion that this body is the chief active constituent of aqueous extracts of ergot, and mentions that its physical constants and physiological properties are identical with those of the body obtained from putrid meat. It is undecided, however, whether this base occurs as such in the ergot, or is formed by bacterial action during the process of extraction.—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1909, 333–335.

Ergot—A Third Active Principle.—In addition to the active principles of ergot, "ergotoxine" and "p-hydroxyphenylethylamine" previously described by G. Barger, that author and H. H. Dale find that the drug contains a third active principle which is responsible for the intense activity exhibited by some ergot extracts in producing contraction of the isolated *non-pregnant* uterus of the cat. This action was found (by Kehrer) to be especially characteristic of Wernich's "Ergotinum Dialysatum." The relative abundance of this principle in dialyzed extracts suggested that it was wholly or partly produced by micro-organisms, and this supposition was confirmed by physiological experiment. It was also found that commercial extracts of meat and of yeast have a similar activity in smaller degree. By a method used by Kutscher (see Proceedings 1906, 624) in the examination of extract of meat, the authors succeeded in separating the physiologically active base from ergotinum dialysatum. It has an intense action on the uterus, and gave Tauly's reaction with p-diazobenzene-sulphonic acid. This, together with the conditions under which the base was precipitated with baryta in the presence of silver nitrate, suggested that it was a derivative of "histidine," which, itself, was found to be inactive, but acquired a trace of activity on heating, and became markedly so when ex-

posed to putrefaction.—Pharm. Journ. and Pharmacist, June 18, 1910, 757; from Proc. Chem. Society.

Ergot—Conflicting Physiological Observations with the Same Preparation.—John C. Umney calls attention to a remarkable divergence of opinion concerning the pharmacological activity of a sample of fluidextract of ergot, which had been prepared from fine bold new Spanish ergot by the Pharmacopœia process and concentrated *in vacuo*, and contained the very high percentage of extractive of 18 Gm. per 100 Cc. It was submitted to different physiological experts, who reported their results within 28 days, and (in brevity) gave the following opinions: (1) "A poor specimen which has very little action on the vessels of the cat." (2) "I find the sample a very active one and in every way satisfactory." (3) "We have physiologically examined your specimen of liquid extract of ergot, and find it to be active and reliable."—Pharm. Journ. and Pharmacist, Dec. 25, 1909, 794.

Ergot—Presence of an Emulsin-like Enzyme.—L. Rosenthaler finds that ergot, in common with many other fungi, contains an emulsin-like enzyme. The presence of this can be demonstrated by adding the pulverized ergot to an amygdalin solution, which results in the formation of hydrocyanic acid in a short time. The enzyme is obtained in an impure condition by precipitating an infusion of the fungus, made with chloroform water, with an excess of alcohol. The hydrolytic action of the ergot emulsin, as compared with that of almond-emulsin, is however quite feeble.—Apoth. Ztg., xxv (1910), No. 1, 5.

Ergot—Instability Due to Enzyme.—Pointing out the well-known practical experience that ergot, which has been completely and rapidly dried, possesses greater stability than ergot which has been slowly and imperfectly dried, J. Schindelmeyer conjectures that the deterioration of the drug, resulting in the formation of a rancid fatty odor, a trimethylamine odor, and a reduction in physiological activity must be due to an organic body, which loses its distinctive activity, wholly or in part, by the thorough drying process to which ergot may be subjected. This view is apparently fully confirmed by the results of comprehensive experiments made by the author, which have determined that ergot contains at least two enzymes, the one having pronounced diastasic activity, the other hydrolyzing the fatty components of the drug, and that both enzymes lose their hydrolytic activity by prolonged keeping or by complete drying.—Apoth. Ztg., xxiv (1909), No. 89, 837-838.

Ergot—Extraction of Fixed Oil with Petroleum Benzin.—The observation of A. Rathje that the fixed oil of ergot when extracted by ether contains as high as 0.6 per cent. of alkaloid (see Proceedings 1909, 152) has led G. Fromme to make experiments with petroleum ether as being possibly a more suitable solvent than ether for the extraction of the oil, since, as is

well known, ergot deprived of the fixed oil retains its activity unimpaired for years if preserved with ordinary care. Having a large quantity of fixed oil extracted from reliable ergot with petroleum ether at his disposal, several portions, each of 250 Gm., were extracted with $\frac{1}{2}$ per cent. hydrochloric acid, the acid solution supersaturated with ammonia and shaken out with ether. The residue of evaporation of the ether, dried to constant weight in the exsiccator, approximated close to 0.015 per cent. of the oil employed in each case. It consisted of a varnish-like, brownish-yellow mass, which readily gave the reaction characteristic of cornutine—an intense blue zone when a trace of the substance was dissolved in chloroform, mixed with about 5 Cc. of ether and poured upon a layer of sulphuric acid. The ergot from which the oil was obtained contained 0.38 per cent. of alkaloid and the yield of oil was about 30 per cent.; consequently the amount of alkaloid extracted from the ergot with the oil did not exceed 0.0045 per cent.—a quantity that can properly be neglected in view of the stability that is imparted to the drug by the removal of the fixed oil.—Pharm. Ztg., liv (1909), No. 77, 758; from Caesar & Loretz Ber., Sept., 1909.

FILICES.

Azolla Caroliniana—*A Mosquito Destroyer*.—According to an interesting communication of R. Francé an aquatic fern, *Azolla caroliniana*, indigenous to the tropics, has in recent years been introduced into various regions in Europe for the destruction of the larvæ of mosquitos, gnats, etc., in ponds, ditches and stagnant waters. In these the plants develop with great rapidity, covering their surfaces completely, and effectually preventing the development of the larvæ into the insects. The plant is found on stagnant pools in Central and South America, also in the interior of Africa and some parts of North America, its small, light green leaves covering the surface of the water profusely.—Pharm. Ztg., liv (1908), No. 63, 612; from "Umschau."

GRAMINACEÆ.

Indian Rice—*Composition*.—The results of analyses of 159 samples of Indian rice by David Hooper, show that the average percentage of protein in these rices is 7.25, with the highest in East Bengal and Assam and Bombay, and the lowest in Cuttack and the central provinces. But individual analyses have shown that the percentage varies from 9.81 in a sample from Broach to 5.44 in a sample from Cuttack. One object in conducting the examinations was to discover what natural circumstances have contributed to the superiority of the composition of the grain. In some cases the local reputation and market value of the rice coincide with the high nitrogen content; in other cases there is no such connection. The richness of the grain appears to be due not so much to the races of the plant or the appearance of the grain as to the cultivation. The grain of

finest composition is found in plants grown in rich virgin soil or in lands liberally manured. Instances of this kind are found in the red rice grown in *taungya* by the Chins of Burma, in the Kanapur rices of the Kárnátic, and in the Kásaragod rices of South Kanara on the western coast. The author thinks that attention to the cultivation of the rice plants in the way of manuring the land appears to be one of the principal means of improving the quality of the grain for commercial and edible purposes.—Pharm. Journ. and Pharmacist, Jan. 8, 1910, 27; Agric. Ledger, 1908-9, No. 5.

Rice—The Practice of "Facing" with Talc.—Dr. J. M. Hamill says that rice millers are generally not content with the appearance given to rice by milling, but endeavor to modify it in various ways by the use of extraneous substances during or subsequent to the milling, or by a combination of these procedures. The polishing material in general use is talc (French chalk) or steatite in the form of a fine powder. For commercial purposes these minerals are considered as identical, though in reality they exhibit a difference in structure, talc being distinctly crystalline, whereas steatite is crypto-crystalline. The talc may be added to the rice as it passes through the mills, and is probably used in the proportion of 1-150th of a gallon per ton of rice. The rice after this treatment is passed through the polishers, where it is claimed that the greater part of even this small quantity of talc added in the mills is extruded with the meal. The rice may then be treated with a glazing mixture, by which it receives a further accession of talc. Such glazing mixtures are usually composed of talc, glucose and glycerin, and the quantities of the glaze used appear to vary according to the kind of appearance which it is desired to give to the grain. Figures relating to the amount of talc found on the rice after the above methods of treatment show that the talc added during the milling was without appreciable effect upon the mineral content of the rice, while the glazing process contributed approximately 0.2 per cent. of mineral matter to the finished rice. But sometimes additional talc is added to "dry off" the mixture, and the percentage of mineral matter might be increased to as much as 0.44 per cent. Small amounts of the polishing material are probably not injurious, but at the same time the presence in a food like rice of comparatively large quantities (1 to 2 per cent.) of insoluble and possibly irritating matter might in some circumstances be definitely prejudicial to health, especially as this food is often given in considerable quantities to children and invalids. Pharm. Journ. and Pharmacist, Feb, 19, 1910, 205; from Rep. Inspectors of Food, 1909, No. 8.

Straw—Disinfectant Value in a State of Incomplete Combustion.—A. Trillat draws attention to the disinfecting power of the gaseous products of the incomplete combustion of straw. The principles of disinfection consist in the presence, in acid medium, of aldehydic and polyphenolic derivatives produced during incomplete combustion of the straw. Their

formation is due to the oxidizing action of the gases of the combustion on the carbon of the straw at a high temperature, the carbon constituting a very energetic catalytic agent promoting production of formaldehyde in a more or less polymerized state. The proportions of the aldehyde found on examining the evolved gases vary, according to conditions, from 200 Mgm. to 2 Gm. per kilogram of straw. To the formaldehyde formed the polyphenols also formed add to the antiseptic action, and, in addition, there is the presence of pyroligneous acid. It is known that the antiseptics, particularly formaldehyde, act much more energetically in an acid atmosphere. The maximum effect is obtained by avoiding too complete combustion, and for this purpose the straw should be arranged in the form of a heap made of alternate layers of the dry and moist material. The method is limited to the disinfection of caves, stables, sewers, tunnels, etc., since only space and surfaces can be disinfected in this way. The burning of straw as a means of disinfection is an old practice, but, as the author maintains, one founded upon true scientific principles.—Pharm. Journ. and Pharmacist, May 7, 1910, 571; from Compt. rend., 150 (1910), 339.

Sugar-Cane—A Source of Useful Wax.—Von Wynberg finds that the press-marc of sugar-cane, after expressing the juice in the process of sugar making, contains 12 per cent. of wax in the dry material, which is readily extracted by benzin, carbon disulphide, carbon tetrachloride or other suitable solvents. The crude wax thus obtained is yellowish or brown. By crystallization from benzin this is separable into two portions, one soft, light-colored and saponifiable, the other dark, hard and unsaponifiable. By purification a hard, shining, white crude wax, melting-point above 80° C., resembling carnauba wax, is easily obtained in large masses. The cane residue from the wax extraction contains over 30 per cent. of sugar, which is easily dissolved out by water.—Pharm. Journ. and Pharmacist, Oct. 2, 1909, 423; from Sucr. Indig., 1909, 51.

Andropogon Grasses—Cultivation Experiments in Ceylon.—At the instigation of the Agricultural Society of Ceylon, J. F. Jowitt has made experiments in the cultivation of Andropogon grasses in the Patanas (open plains) of Ceylon, at an elevation of 4,500 feet. In these experiments he employed the different varieties of citronella grass (Mana, Mana Pengiri and Lenabatu), also lemon-grass (*Cymbopogon flexuosus* Stapf and *C. citratus* (Stapf), as well as palmarosa and vetiver (khus-khus) grass and *Cymbopogon polyneuros*. Owing to the change in climatic conditions due to the high altitude, *C. citratus* was altogether a failure, and the greater part of the remaining grasses also flourished but poorly, the soil being insufficiently rich for the proper development of the plants. Better results were obtained after the use of natural and artificial manure, most of the grasses either requiring the application thereof before they showed any proper development, or the oil being improved both qualitatively as well as

quantitatively by the manuring of the plants. The latter result, for instance, was observed by Jowitt in the case of Mana grass, which in the green state only contained traces, and after drying slightly larger proportions of oil of an unpleasant odor. Artificial fertilizing caused a noticeable increase in the oil yield, and the oil, moreover, acquired a much improved odor, although one altogether differing from that of citronella oil.

With regard to the differences between Maha Pengiri and Lenabatu, Jowitt expresses the view that the two grasses differ not only in leaf, flower, and odor, but also in the peculiarity that the roots of Maha Pengiri are more on the surface, while Lenabatu is more deeply rooted. He therefore designates the two plants respectively as "surface feeder" and "deep feeder." For the distillation of the grasses Jowitt used a copper still of a capacity of 115 to 120 lbs., surmounted by a dome-shaped helm, the object of which was to avoid the passing-over of oxidation- and resinous products of high boiling-points. In order to prevent the singeing of the distilling material, the still was provided with a sieve-bottom, which was held in its place in a most primitive manner by placing it on two blocks of wood. Direct heat was applied, and the distillation was a so-called water distillation. The grass was reaped in the evening before it was distilled, and was placed whole in the still, as there was no advantage in cutting it up. For a full charge of grass, 30 gallons of water was added, but when the charge of grass was less, the addition of water was not proportionately smaller; for instance, for 50 lbs. of grass, 25 gallons of water was used. Each charge requires 4 hours to distil, the water which passes over first of all being returned to the still.—Schimmel's Semi-An. Rep., October, 1909, 42; from Agricultural Journ. of the Royal Bot. Gardens, Ceylon, iv, No. 14, 109.

Citronella Grass—Occurrence in the Wild State in Ceylon.—In his paper on the classification and the new nomenclature of the antropogon grass, (see Proceedings, 1907, 758) Stapf stated that citronella grass (*Cymbopogon nardus*, Rendle) only occurs in Ceylon in the cultivated state, and that its mother plant is probably "Mana grass" (*Cymbopogon confertiflorus*, Stapf; *Andropogon nardus* var., *nilagiricus*, Hack.), which grows wild in Ceylon and is poor in oil. J. F. Jowitt now opposes these views. His investigations show that, besides mana grass, genuine citronella grass, *C. nardus* Rendle, also grows wild in Ceylon. Hence the surmise expressed by Stapf and referred to above appears to him of doubtful correctness. *C. nardus* Rendle, which occurs in a wild state, is identical with the so-called "old citronella grass" (Winter's grass, Maha Pengiri) and forms a species distinct from Mana grass. It is possible that a third variety, known as Lenabatu grass, has resulted from hybridization of citronella and Mana grasses. In these circumstances Jowitt considers it advisable to designate the Maha Pengiri variety as a separate species

under the name of *Cymbopogon winterianus*. In this case the name *C. nardus* Rendle should be applied only to the Lenabatu grass.—Schimmel's Semi-An. Rep., Oct., 1909, 41; from Annals of the Royal Botanical Gardens, Peradeniya, vol. iv, part iv, 185.

Citronella Grass—Possible Effect of Altitude on the Oil Content.—According to A. J. Ultée several oil-yielding grasses, especially *Cymbopogon nardus*, *C. citratus*, *C. martini* and *Veliveria zizanioides* are grown in the botanical gardens at Salatiga (S. E. of Buitenzorg, Java). The most important of these is *C. nardus*, or citronella grass. As the altitude of Salatiga is considerably above that of Buitenzorg, Ultée made experiments for the purpose of ascertaining whether this difference influences the character of the oils. He obtained by distillation 0.66 per cent. of an almost colorless oil with the following constants: $d_{20} = 0.8721$, $n_D = 30^\circ 15'$, total geraniol (calculated by de Jong's method 92.75 per cent., soluble in 1.5 vol. and more of 80 per cent. alcohol. The oil was distinguishable from the Buitenzorg distillates in the first place by its greater solubility, for according to de Jong the Buitenzorg oils only gave a clear solution with 3 vols. of 90 per cent. alcohol, which became cloudy when diluted to over 4 vols. As Ultée only obtained an oil yield of 0.66 per cent., whereas in Buitenzorg the yield ranged from 0.5 to 0.9 per cent., experiments were made at Salatiga to ascertain whether the oil content of the grass could be raised by suitable fertilizing. Out of four experimental fields, three were treated for this purpose with differently-composed artificial manures. The grass was cut after 10 weeks and equal quantities of it distilled in an exactly similar manner. The oil yields obtained ranged from 0.60 to 0.65 per cent., showing that manuring had not affected the oil content of the grass.—Schimmel's Semi-An. Rep., April, 1910, 41; from "Culturerigids," Organ van het Algemeen-Proefstation of Java 11 (1909), 404.

Palmarosa Grass and Gingergrass—Difficulty to Differentiate.—In his notes of a recent journey of investigation, Mr. J. H. Burkhill, of Calcutta, discusses the problem of differentiation between palmarosa grass and ginger grass—a question which has already frequently occupied botanists, but which up to the present has not been elucidated. According to Burkhill's observations, palmarosa grass (*Motia*) and ginger grass (*Sofia*) are doubtless different varieties of *Cymbopogon martini*, Stapf, and in this view it is quite correct to designate them respectively as var. *Motia* and var. *Sofia*. It is however not easy to distinguish them from each other, as on the whole they are very much alike and their chief difference is a chemical one, the oils contained in them being different. It is practically impossible to notice any difference in dried specimens of the grasses, for which reason even so experienced a botanist as Stapf was unable to recognize any variation in the two grasses. The subject is placed in quite a

different light, however, when the grasses are seen in the open in the place where they grow. Here they are soon differentiated by their external appearance, and after a time they can be distinguished even at a distance of 15 to 20 yards. The reason of this is that the grasses do not grow equally well in the same localities, as each requires a different climate and soil. As a result, when they grow side by side and under the same conditions they develop unequally, which makes it possible to distinguish them without difficulty.

Burkhill found that *Motia* flourishes best on dry soil at the foot of the hills or on moderately high slopes facing southwards and only slightly wooded. *Sofia*, on the other hand, demands moisture and grows particularly well where this is supplied by plentiful dew or mist. It prefers higher altitudes and wooded places, even as high as the hill tops, but it may also be found at lower slopes, except those which face southward. Very favorable places for *Sofia* are the teak forests (*Tectona grandis* L., East-Indian Oak) where, owing to the rapid evaporation of water during the night, the air cools down to a considerable degree, and abundant dew is formed. But in spite of all these individual preferences, both *Motia* and *Sofia* may be found at any altitude, provided the other conditions are favorable. Schimmel's Semi-An. Rep., October, 1909, 90; from Journ. Asiatic Soc. of Bengal, v (1909) No. 3 (U. S.)

PALMACEÆ.

Dried Bananas—Composition.—Dr. Max Winckel, extolling the value as a food product of bananas dried after fully ripening on the plants, thereby retaining aroma and attaining a maximum of sweetness, communicates the results of an analysis of such peeled and dried bananas, supplied under the designation of "Urwald-Banane," as follows: Water, 13.43 per cent.; dry substance, 86.57 per cent. Ash, 3.43 per cent.; nitrogenous substance, 5.57 per cent.; *invert sugar*, 67.27 per cent.; crude fiber, fat, fruit-acid, etc., 10.20 per cent; substance insoluble in water, 9.35 per cent. The peel amounts to about 40 per cent. in weight of the whole fruit. With the exception of the crude fiber, the entire dried banana is rapidly and easily digested. Its caloric value is 308, its nutrient value 783, and it therefore appears well adapted for and to constitute a cheap food for the masses. Apoth. Ztg., xxv (1910), No. 49, 440.

ASPARAGNEÆ.

Asparagus—Two New Carbohydrates.—C. Tanret finds that the subterranean parts and the green berries of asparagus contain two new carbohydrates, which he has named respectively:

Asparagose and Pseudo-Asparagose.—The asparagose occurs in microscopic spherocrystals which polarized light, while pseudo asparagose is amorphous. Asparagose belongs to the group of carbohydrates ($C_6H_{10}O_5$)

nH_2O , approaching the limit $C_6H_{10}O_6$. Cryoscopic results indicate that the molecule is a multiple of 15 or 16 of this. When hydrolyzed it affords about 93 per cent. of levulose and 7 per cent. of glucose. Asparagose is not precipitated from aqueous solution in the cold by barium hydroxide solution; it is precipitated, however, by a strong tepid solution, and is redissolved in excess of the precipitant. It is thrown down, however, by barium hydroxide in the presence of alcohol, and is isolated by fractional precipitation of the purified aqueous extract of asparagus roots in this manner. Asparagose does not reduce Fehling's reagent, nor give a color with iodine. Yeast invertin attacks it very slowly. The juice of asparagus roots contains about 6.7 per cent. of this body. Pseudo-asparagose is obtained from the mother liquors after removing asparagose by evaporating to dryness, and extracting the residue with boiling methyl alcohol. The solvent is distilled off, and the residue fractionated with barium hydroxide and alcohol. It is more soluble in ethyl and methyl alcohol than asparagose. It yields 86 per cent. of levulose, and 14 per cent. of glucose on hydrolysis. It occurs in about the same quantity as asparagose. Neither of these carbohydrates are found in the shoots of asparagus as used as a vegetable nor in the ripe red berries of the plant.—Pharm. Journ. and Pharmacist, Aug. 7, 1909, 205; from Compt. rend., 149 (1909), 48.

LILIACEÆ.

Colchicum.—*Historical Study*.—Dr. Gordon Sharp has made a comprehensive historical study of colchicum, tracing this valuable medicament through all phases of its application as a remedial agent, its botanical and pharmacognostic relations, its chemical, pharmacologic and therapeutic properties, from the earliest mention of the drug to the present day. This interesting paper must be consulted in the original, in Pharm. Journ. and Pharmacist, July 3, 1909, 5-6.

Colchicum.—*U. S. P. Assay of Seed and Corm*.—While making colchicine on a large scale by a process similar to that of the assay process of the U. S. P., A. R. L. Dohme, H. Engelhardt, and Roland Schmidt found the yield of pure colchicine to be below the amount which should have been obtained according to the percentage of alkaloids determined as being present by the official assay process. Experiments following this observation prove, or was suspected that the colchicine obtained by the U. S. P. process of assay is by no means pure, especially that obtained from the corm, which in an assay of 8 samples showed impurities amounting to from 51.6 to 64.7 per cent., while in the case of 9 samples of colchicum seed the impurities amounted to from 32.2 to 41.9 per cent., as compared with the results obtained with a modification of a process, yielding pure colchicine, published by Panchaud in 1906 (Schw. Wschr. f. Chem. u. Pharm., 1906, p. 563). This process, as applied by the authors

is described in the present paper which may be consulted in *Drugg. Circ.*, Feb., 1910, 59.

Colchicum Seed—High Percentage of Sugar in Commercial Samples.—Mr. E. M. Holmes' attention having been drawn by Mr. J. C. Umney to the high percentage of glucose in some samples of colchicum seed, he supplied the latter with two specimens from the Museum of the Pharm. Soc. of Great Britain, for the purpose of comparison with commercial specimens. Mr. Holmes observes that the fresh seeds as taken out of the capsules are usually sticky, the glucose probably being derived from the strophiole, but in the process of drying more or less of the glucose and strophiole may be rubbed off in proportion to the dryness or moisture of the seed, which would be dependent also to a certain extent on the dryness of the atmosphere in which they are kept. To ascertain what variation occurs in the percentage of glucose Mr. Umney has made a comparative examination of the Museum seeds, as well as of six commercial specimens. These yielded the following figures :

Extract Made from Tincture.	Sugar in Extract of Tincture.	Sugar in Seed.
Per Cent.	Per cent.	Per cent.
1*..... 1.60	11.3	0.90
2*..... 1.60	17.0	1.35
3 2.14	28.8	3.08
4 2.26	28.7	3.24
5 2.38	36.0	4.28
6 2.90	36.1	5.23
7 2.90	36.1	5.23
8 3.80	36.9	7.00

The variation does not necessarily indicate the fraudulent addition of glucose, since the comparatively low price of colchicum seeds would hardly allow of a sufficient profit even if the highest quantity of glucose found were added, but the figures are important as showing a source of error if the strength of the tincture be judged from the amount of extractive yielded by it.—*Pharm. Journ. and Pharmacist*, Jan. 15, 1910, 51.

Garlic—Constituents Producing the Volatile Oil.—According to Rundgoist, garlic contains a sulphurated glucoside, *alliin*, which is hydrolyzed by a special ferment, *allisin*, an oxydase, with the formation of fructose and essential oil of garlic. Alliin itself is not alliaceous in odor. Besides these constituents, garlic contains a peculiar carbohydrate. This is tasteless, is not colored by iodine, and gives a bulky precipitate with barium hydroxide. When hydrolyzed with dilute sulphuric acid it yields fructose. This carbohydrate was also isolated and described by Chevastelon in 1894. —*Pharm. Journ. and Pharmacist*, May 14, 1910, 609; from *Journ. de Pharm. et Chim.*, 1910, 402.

* Museum Specimens.

Ornithogalum Thyroides—*Proximate Constituents*.—Frederick B. Power and Harold Rogerson have made a chemical examination of the entire flowering plant, including the under-ground bulbous portion of *Ornithogalum thyroides*—a South African plant, reputed to be poisonous, many deaths among horses having been attributed to it when mixed with forage. The results of the chemical examination prove the absence of an alkaloid. The plant yielded a very small amount of an essential oil to steam distillation. Other constituents found are: A sugar, yielding d-phenylglucosone and a dark resin, which yielded to various solvents the following bodies: Palmitic acid, pentatriacontane ($C_{35}H_{72}$), a phytosterol ($C_{27}H_{46}O$), a very small amount of volatile fatty acids, a small amount of the dihydric alcohol, ipuranol ($C_{20}H_{38}O_2(OH)_2$). The chloroform, ethyl acetate, and alcohol extracts were all dark colored, amorphous products, from which nothing definite could be obtained. The repeated poisonous properties of the plant have been fully confirmed, inasmuch as the administration of 5 Gm. of the ground air-dried material to guinea-pigs was attended with fatal results. The toxic principle appears to be chiefly contained in the resin.—Pharm. Journ. and Pharmacist, March 12, 1910, 326-328.

Veratrum Album—*Toxic Effect of Contact with the Unripe Seed*.—Ludwig Reinhard directs attention to the poisonous effect on the fingertips of a person who had touched the unripe seeds of *Veratrum album*. The effect manifested itself by a burning sensation followed by the formation of blisters, which were quite large and painful, but yielded to treatment in the course of a week.—Pharm. Ztg., liv (1909), No. 86, 852; from Münch. Med. Wschr., 1909, No. 40.

IRIDEACEÆ.

Saffron—*Adulteration with Synthetic Coloring Matter*.—Bettink directs attention to the adulteration of saffron with a nitro-coloring matter closely resembling *crocin* in color and gives two simple methods for its recognition. Evidently most of the crocin having been removed from the saffron by treatment with diluted alcohol, its original color was restored by means of the nitro-coloring matter. Saffron so treated resembles the unadulterated drug very closely, but it has a fainter odor and its color is not so dark orange brown, while it feels rough, not fatty, when handled. Water and ash content are approximately normal, and it gives also the characteristic blue color with sulphuric acid. The first method for detecting the nitro-coloring matter depends on its ready solubility in water (the crocin dissolving slowly) and the determination of nitric acid in the aqueous solution, which must for this purpose be obtained by shaking the sample not more than half a minute with water. The second method depends on the discharge of the yellow color due to nitro-coloring matter when a few drops of sulphurous acid are run into the aqueous solution obtained under the previous conditions.—Pharm. Ztg., liv (1909), No. 77, 757; from Pharm. Weekbl., No. 3, 1908, through Cæsar & Loretz Ber. Sept., 1909.

Ground Saffron—Percentages of Moisture and Ash.—An examination by A. Beythien of 120 sample of ground saffron showed the lowest percentage of moisture to be 5.01, the highest 12.25, and the average 8.90; 90 per cent. of the samples gave figures between 7 and 12 per cent. These figures represent the total loss on drying to constant weight, and therefore include the traces of volatile oil, which would be driven off. The ash of 112 samples was determined, and varied between 3 and 10 per cent.; omitting two samples which contained sand, the highest figure was 8 per cent., and this is regarded as a proper maximum limit. So-called "natural saffron" has been found to contain as much as 30 per cent. of styles, but such an article should not be regarded as genuine, or accorded recognition as a commercial grade.—Pharm. Journ. and Pharmacist, June 25, 1910, 788: from Ztschr. Untersuch. d. Nahr.-u. Genussm., April 1, 1910, 365.

AMOMACEÆ.

Ginger—Assay of Gingerol.—In a former communication (see Proceedings 1908, 185), H. Garnet and J. Grier had shown that in the assay of ginger the use of caustic alkalis for the purpose of combining the acid resins resulted in the partial or complete decomposition of the "gingerol" and then led to erroneous results. In their present work they tried sodium carbonate, ammonia, lime and magnesia, but found their use no advantage. They have employed light petroleum (b. p. 70° to 90° C.), pure ether (free from alcohol and water), pure acetone, pure alcohol and alcohol of 50 and 60 per cent., all of which dissolve the gingerol, but vary in the amounts of inert fatty, resinous or inert matters accompanying the gingerol, depending on the solvent used. The most complete extraction of the gingerol results with the use of pure ether, but in their extraction it is associated with inert fatty and resinous constituents. The ether is therefore removed by distillation, the residue boiled with repeated portions of petroleum spirit, and the petroleum spirit is shaken out with three successive portions of 60 per cent. alcohol, leaving in the petroleum spirit the volatile and fatty oil and much coloring matter. The alcoholic solution is then washed with a further portion of petroleum spirit, which removes the last traces of fat, etc., the alcohol is evaporated off or recovered, and the residual liquid shaken out with three successive portions of ether; the ether is evaporated off, and the gingerol weighed, after drying to constant weight in a water bath. The yield from Jamaica ginger was 1.1 per cent.; from Africa ginger, 2.0 per cent. The purity of gingerol is ascertained by its ready solubility in cold 1 per cent. aqueous potash solution.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 344-346.

ORCHIDEACEÆ.

Tahiti Vanilla—Characters and Constituents of Volatile Oil.—W. Busse

a number of years ago (1898-1899) surmised that the fruit of certain inferior varieties of vanilla, the so-called "vanillons," as well as the fruit of *Vanilla planifolia* Andr., which is cultivated in Tahiti, contains piperonal as well as vanillin. Schimmel & Co. have now made an investigation of Tahiti vanilla, in order to obtain a further knowledge of the aromatic principles contained therein. Preparing an ethereal extract from 9.2 Kgm. of this vanilla, and subjecting this to steam distillation after first removing the vanillin by means of soda liquor, 7 Gm. of a pale brown volatile oil with a pleasant characteristic odor were obtained, which showed the following characters: The oil was heavier than water; its b. p. lay between 105° and 118° C. (6 Mm.); 6 g. distilled over at about the b. p. of anisic alcohol, 115° to 118° C. (6 Mm.). Artificial anisic alcohol prepared from anisic aldehyde showed, at 5 Mm., a b. p. of 117° to 118° C. The fraction 115° to 118° C. of the vanilla oil contained, besides anisic alcohol, a little aldehyde, of which the semicarbazone melted at 204° C. With phenyl isocyanate the fraction gave a urethane, m. p. 93° C., which was identical with the urethane from artificial anisic alcohol. When the fraction was oxidized with permanganate solution anisic acid was formed, m. p. 180° C. Free anisic acid was also detected in the alkaline extract of the vanilla extract. On the other hand, no piperonal could be discovered. The presence of anisic alcohol and anisic aldehyde, which are constituents of the odoriferous substances of the more valuable Bourbon vanilla could not be determined, but will be the object of further investigation with considerable quantities of raw material.—Schimmel's Semi-An. Rep., October 1909, 142.

ARISTOLOCHIACEÆ.

Mikania Guaco—*A South American Snake Antidote*.—O. Tunemann identifies a South American drug introduced under the name of *Mikania Guaco* to be derived from a species of *Aristolochia*, for which he provisionally proposes the designation

Rhizom. Aristoloch. Paraguay.—The drug consists of parts of the stem and rhizome of the plant and has the reputation of being an antidote for snake bite. The chemical examination reveals the presence of about 1 per cent. of volatile oil of a light yellow color and distinct acid reaction, having an agreeable mint-like odor and burning, afterwards cooling, taste. It is composed of a crystalline acid, a crystalline phenol, an ester, and a terpene. The drug contains no alkaloid.—Pharm. Ztg., lv (1910), No. 39, 396; from Gehe & Co., Spring Rep., 1910.

LAURACEÆ.

Laurus Nobilis—*Abortive Properties of the Fruit*.—E. M. Holmes mentions that in 1907 he identified some fruits which had been used for the production of miscarriage, to be laurel berries; the fruits, crushed and

swallowed with an infusion of parsley, producing the desired result. This use of the laurel berries is not mentioned in any work on toxicology or medical jurisprudence to which he has access, although this action of the plant was known to Dioscorides who states that the bark kills the foetus. The berries seem worthy of further investigation.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 52.

Camphor—Cultivation Experiments.—In the course of a report on the present position of the camphor-market, Cayla refers to experiments made by Campbell and Eaton at the botanical gardens at Batu-Tiga, Selangor, in preparing camphor from leaves. The plants were raised from Japanese seed, sown in May, 1904, and were transplanted in December, 1904. When 5 years old the plants were in excellent condition, most of them being 20 and some even 27 feet high. The leaves from these trees were dried partly entire and partly cut-up, and distilled moist, as were the twigs, which had been cut up into one-inch pieces. It was shown that the drying of the leaves (provided it be not done in bright sunlight), does not affect the yield of camphor, a conclusion which agrees with that arrived at some time ago by Giglioli. The distillate from the leaves consisted mainly of camphor, with only a small proportion of oil; the yield was considerably larger than that obtained from the twigs and the wood from the trunk, being, in fact, equal to at least 1 per cent. of the fresh green leaves. In comparative distillations, the yield of camphor from the various parts was as follows :

Leaves.....	1	per cent.
Twigs.....	0.216	per cent.
Thicker branches and trunk.....	0.662	per cent.
Root	1.20	per cent.

It follows that in the case of young trees the leaves afford the best distilling material, as the roots, of course, are not available for use. Three hours is a sufficient time for distilling the leaves and twigs (it is not stated for what quantity). In Formosa it is usual to continue the distillation of the chopped wood for 24 hours.—Schimmel's Semi-An. Rep., April, 1910, 27; from Journ. d'Agriculture tropicale, 10 (1910), 8.

American-grown Camphor is the title of an interesting article by R. H. True and S. C. Hood, which appears in the "Proceedings" of 1909 (pp. 719-721), from which it appears that all the evidence so far points toward a distinctly favorable outcome in the endeavor to produce camphor on a profitable basis.

Ngai Camphor—Variable Composition.—Schimmel & Co. have examined and report the results obtained with a sample of Ngai camphor recently received from Mr. R. S. Pearson, of Debra Dun, British India, from which it becomes evident that the constitution of Ngai camphor varies

considerably. Whereas a sample examined by them in 1895 consisted almost entirely of *l-borneol*, the present sample was found to contain about 75 per cent. *l*-camphor and only 25 per cent. oil. The crude product showed a spec. rot. $[\alpha]_D - 46.26^\circ \text{C.}$ in a 54.18 per cent. solution of xylene, its m. p. being 175°C. After acetylation, the same xylene solution showed a saponification number of 46.4, corresponding to 13.2 per cent. of borneol. From this the borneol content of the Ngai camphor itself could be calculated at 24.4 per cent. The separation of the two constituents was effected in the usual manner by converting the borneol into its phthalic ester acid and driving off the camphor by steam. After repeated crystallization the two bodies were identified as *l*-borneol and *l*-camphor, with the subjoined constants:

1. *l*-borneol: m. p. 204°C. , $[\alpha]_D - 35^\circ \text{C.}$ (in a 20 per-cent. alcoholic solution).

2. *l*-camphor: m. p. 176°C. , $[\alpha]_D - 43.15^\circ \text{C.}$ (determined in a 50 per-cent. xylene solution); m. p. of the oxime 119°C. The solution of the oxime was dextrorotatory.

From the slight rotations of the isolated pure bodies it is to be inferred that the admixed yellow oil must be strongly *lævorotatory*, but it was impossible to polarize the latter, the available quantity being too small.—Schimmel's Semi-An. Rep., April, 1910, 148.

Camphor—Borax Crystals as Adulterant.—Attention is drawn by "Hz" to lump camphor adulterated with considerable quantities of borax crystals. The presence of the adulterant was not evident on superficial examination, since the borax crystals had acquired a strong odor of the camphor. The attempt to make spirit of camphor of course readily revealed the adulterant, but the public would be readily deceived.—Pharm. Zentrhl., 50 (1909), No. 35, 725.

Seychelles Cinnamon Bark—Botanical Source and Constituents.—In a previous report, Schimmel & Co. described a cinnamon bark oil from the Seychelles Islands and subsequently stated that the cinnamon trees in the Seychelles were originally introduced from Ceylon (see Proceedings, 1909, 309–310). Rosenthaler has now examined a sample of the bark, supplied to him by Schimmel & Co., and has ascertained that the bark differed from all other cinnamon barks known and described. More recently, however, Rosenthaler has procured young examination material from Mahé (Seychelles), and in conjunction with Reis he has continued his investigations on bark from the branches and trunk, from which it appears that anatomically the structure of the branch-bark agrees entirely with that of Ceylon cinnamon. The authors also give a precise, illustrated description of the bark from the trunk, and as this bark was derived from the same trees which produced the branch-bark, it follows that it, too, must be Ceylon cinnamon. The differences in the constitution of Ceylon

and Seychelles cinnamon oils, observed by Schimmel & Co., according to Rosenthaler and Reis do not apply to the question of origin, because in the matter at issue the bark is of different age and geographical origin. The following analytical results obtained by the authors show the chemical constitution of the bark from the trunk: Aqueous extract, 6.52 per cent.; alcoholic extract, 7.27 per cent.; total ethereal extract, 4.20 per cent.; volatile ethereal extract, 2.83 per cent.; non-volatile ethereal extract, 1.37 per cent.; protein matter, 2.04 per cent.; crude fiber, 36.04 per cent.; cinnamic aldehyde, 1.33 per cent.; water, 9.38 per cent.; ash (including 0.44 per cent. insoluble in HCl), 8.6 per cent.—Schimmel's Semi-An. Rep. April, 1910, 35.

Cinnamomum Loureirii, Nees.—*Source of Cinnamon Used in Japan and Exported also from Annam*.—In an exhaustive article on the cinnamon tree, its distribution and cultivation, as well as the distinctive characters of the volatile oils obtained from the different species (see *Cinnamom oils* under "Organic Chemistry," Cayla mentions, besides *Cinnamomum cassia*, Bl., and *C. zeylanicum*, Nees, a third species, *C. Loureirii*, Nees, which yields the cinnamon bark used in Japan. This species, he states, has long been grown in Annam, the trade in the product being in the hands of the Annamese and Chinese, who distinguish the following brands of cinnamon: *Que-kep*, from trees over 4 inches in diameter; *Que-kien*, from smaller trees and from trees which have been prematurely stripped; and *Que-thank*, from branches. Regarding the cultivation, the author observes that it would be possible to produce large quantities of good cinnamon in Further India, but it is not advisable to recommend the extension of cultivation, because heavy over-production is to be feared. Generally speaking, this industry is in the hands of the Natives, and this is the best way for securing the continuance of its profitability. Europeans should limit themselves to the trade in the produce. Schimmel's Semi-An. Rep., Oct., 1909, 37-39; from Journ. d'Agriculture tropicale, 9 (1909), 164.

Cinnamomum Mercadoi, Vid.—*Characters of Oil from this Species, Occurring in the Philippines*.—Bacon calls attention to a species of *Cinnamomum*, *C. mercadoi*, Vid., which occurs in many parts of the Philippines. The Tagal name for the tree is *calingag*. 25 kilos bark of such a tree from the district of Lamao, Prov. of Bataan, when ground, yielded 260 g. = 1.04 per cent. of a pale yellow oil, with an odor resembling sassafras, and possessing the following constants: d_{40}^{300} 1.0461, $a_{D_{300}} + 4^{\circ}$, $n_{D_{300}}$ 1.5270. Aldehydes could not be detected either with bisulphite or with phenylhydrazine. Fractionation *in vacuo* at 10 mm. gave the following results:

Fr. 1 (77 g.) b. p. 119 to 124°, $n_{D_{300}}$ 1.5333.

Fr. 2 (9.2 g.) b. p. 124 to 130°, $n_{D_{300}}$ 1.5320.

Residue 11.5 g. $n_{D_{300}}$ 1.5278.

After repeated distillation at ordinary temperature the first fraction showed the following constants: b. p. 235 to 238° (760 mm.) d_{40}^{200} 1.0631, $a_{D_{300}}^{1500} + 0.9^\circ$, $n_{D_{300}}^{15335}$. Oxidation by means of chromic acid resulted in piperonylic acid, m. p. 227°. Heating with alcoholic potash and subsequent oxidation with permanganate yielded piperonal. From this it would seem fair to infer that the oil of this species of *Cinnamomum* consists almost entirely of safrol.—Schimmel's Semi-An. Rep. October, 1909, 40; from Philippine Journ. of Sc., 4 (1909), A, 114.

Cinnamomum Tamala, Nees et Eberm—*Characters of Vol. Oil from the Leaves*.—The leaves of this species of *Cinnamomum*, a medium-sized tree abounding in Southern Asia, were in former years met with in commerce under the designation of "the narrow *Folia Malabathri*," but are now obsolete. A sample of oil, distilled by Mr. I. H. Burkill, of Calcutta, has been examined by Schimmel & Co., who report the following results: The lemon-yellow oil had a clove-like, and at the same time slightly peppery, odor. It possessed the following constants: d_{150}^{10257} , $a_D + 16^\circ 37'$, $n_{D_{200}}^{152596}$; phenol-content 78 per cent., soluble in 1.2 volumes and over of 70 per cent. alcohol. The phenols consisted of eugenol (m. p. of the benzoyl compound 69° C.). When freed from phenols, the oil had the high optical rotation $a_D + 66^\circ 40'$ and yielded a solid nitrite which, when recrystallized from ethyl acetate melted at 113° to 114° C. It contained therefore d- α -phellandrene. In respect of its high eugenol content it is closely allied to the ordinary oil from Ceylon cinnamon leaves.—Schimmel's Semi-An. Rep., April, 1910, 122.

MYRISTICACEÆ.

Mace—*Chemical and Microscopical Examination of the Powdered Drug*.—"W." recommends the method of Busse as being the most reliable for the chemical examination of powdered mace, the method depending on the deep red color produced by the action of alkalis in the coloring matter of *wild* (= Bombay) mace. The test is carried out by immersing a strip of filter paper in an alcoholic tincture of the sample for half an hour, drying the strip in the air, pouring on boiling baryta water and again drying. In the case of *true* (= Banda) mace, the upper layer of the paper assumes a brownish-yellow color, whereas in the presence of *wild* mace it becomes brick-red. The method is available for the detection of an admixture of 3 per cent. of wild mace. Under a microscopic lens of 50 diameters, the method becomes available for the direct examination of the powder. If to a little of the powder, triturated with water on the object-glass, some solution of KOH is allowed to flow, the luminous yellow oil-cells of the Bombay mace assume a purple-red color and are easily distinguished from the genuine mace powder associated with it even during parting.—Pharm. Ztg., liv (1909), No. 86, 851.

Genuine and Adulterated Mace—Analytical Data.—A. H. M. Muter and Charles A. Hackman contribute some valuable analytical data obtained with samples of genuine (Banda) Mace and of other varieties of mace—Java, Macassar, and particularly Bombay mace, the latter, so-called "wild mace" being usually employed for adulterating the powdered genuine mace. The tests made to detect Bombay mace in the powder were both qualitative and quantitative: (1) Microscopic appearance; (2) character of color produced by a drop of alkali on a slip of filter paper moistened with an alcoholic solution of the sample; (3) repeated extraction with fixed fractional quantities of 98 per cent. alcohol and treatment of each fraction with lead acetate—the addition of which fails to react after the third extraction of genuine (Banda) mace, but continues to produce precipitates or color after a 25th extraction of wild (Bombay) mace; (4) the quantitative tests mentioned in the table following:

Description of Sample.	Per Cent. Volatile Ether Extract.	Per Cent. Non-Volatile Ether Extract.	Per Cent. Ether Extract (after Extraction with Petroleum Ether).	Per Cent. Mineral Matter.	Color Test on Filter Paper with $\frac{N}{10}$ Soda.	Microscopical Appearance.
* Java Mace	5.4	24.3	2.25	1.84	Marked buff-pink. . .	—
* Macassar Mace	7.4	49.1	2.05	1.68	Faint buff-pink	—
* Bombay Mace	5.2	61.0	32.05	1.40	Deep orange-red	—
Sample No. 1	—	34.3	3.48	1.88	Light buff-pink	Genuine mace.
" 2	—	44.1	15.76	1.84	Deep orange-red	Much Bombay mace present.
" 3	—	29.4	3.08	1.84	Light buff-pink	Genuine mace.
" 4	—	28.8	1.70	2.28	Light buff-pink	Genuine mace.
" 5	—	30.0	1.90	2.00	Light buff-pink	Genuine mace.
" 6	—	30.5	2.80	2.40	Light buff-pink	Genuine mace.
" 7	—	30.7	1.75	2.00	Light buff-pink	Genuine mace.
" 8	—	30.6	2.95	1.84	Marked buff-pink	Genuine mace.
" 9	—	30.8	3.50	2.20	Light buff-pink	Genuine mace.
" 10	—	30.7	2.35	1.80	Light buff-pink	Genuine mace.

—Pharm. Journ. and Pharmacist, July 31, 1909, 132.

Bombay Mace—Detection.—James W. Gladhill recommends the following as being the quickest and surest way of detecting Bombay Mace when it is mixed with other mace: An alcoholic tincture of the suspected material (1 Gm. to 10 Cc.) is made by maceration for 2 hours and filtration. On adding 5 Cc. of solution of chlorinated soda to 2 or 3 Cc. of this alcoholic tincture, carefully allowing it to run down the inside of the tube, a bright red color will appear at the point of contact of the two

* These were whole samples, pulverized by the author, the others purchased powders.

liquids, if Bombay nace is present. The color does not remain long, and disappears very rapidly when less than 1 per cent. is present: but the test is available with as little as $\frac{1}{80}$ of 1 per cent.—Proceed. Penna. Pharm. Assoc., 1909, 331.

POLYGONACEÆ.

Rhubarb.—*Recent Inquiries into the Source of the Chinese Sorts*.—E. M. Holmes remarks that the source of Shensi rhubarb cannot be said to have been identified with certainty. This rhubarb exhibits on the outer surface a network of white lines, especially in the soft pieces which has not been shown to occur in any of the plants cultivated in Britain as the source of Chinese rhubarb. It fetches the highest price in China, often costing as much as 60 taels per picul. Anyone who has examined a long series of Chinese rhubarbs must come to the conclusion that the drug is derived from more than one species. Szechuen rhubarb is evidently the product at least in part of *Rheum officinale*, judging from the information recently published by Mr. E. H. Wilson and Dr. A. Henry. It is collected, according to the former, on the Kiu-tsao-shan range of mountains, which separates the provinces of Szechuen, Kansu, and Shensi. Mr. Wilson found this species in forests 8,000 ft. above sea level, reaching its best at 11,000 ft. to 12,000 ft., but extending up to 14,000 ft., that growing in the open beyond the forests being preferred. Plants raised from seeds gathered by him in 1900 flowered at Kew, and were identified then as *Rheum officinale*. The same plant was found by Dr. A. Henry in Hupeh, at an elevation of 7,000 ft. to 9,000 ft. This rhubarb finds its way to Hankow, and is there classed with the Szechuen rhubarb.

Mr. Wilson's notes concerning the collection of the root are interesting. The oldest plants are selected, ten-year-old plants being considered the minimum age, although the roots of six to seven-year-old plants are not infrequently collected. The root is dug up during the latter half of September and in October, and the digging is continued until snowfall renders it impracticable. In some cases the root is also dug in spring, before the new growth starts. The Chinese consider the rootstock or erect rhizome better than the roots for medicinal purposes, and remove the roots and then peel and cut the rootstock transversely or longitudinally, and these pieces when dried form respectively the rounds and flats of the Chinese rhubarb of commerce. According to Hobson, the roots are usually gathered twice a year, just before the flowering season, in March and April, or after the seed has ripened in July and August, and strung on strings and dried under the eaves of the houses, pierced with holes, just as capsicum is in Hungary; but they are often, probably as the weather gets colder, dried on heated stones. At Tatien-lu, where the climate is very moist, it is partly dried over brushwood fires. The root is only trimmed roughly by the gatherers, and is further trimmed, sorted,

and graded by the dealers at Chungpa, Mien chu, Kuan-hsien, and Yachou. From Yachou it is brought on rafts to Kiating, and there placed on boats and carried to Chungking. The Chinese consider the Tatien-lu rhubarb as less valuable on account of the method of drying by artificial heat, and in this they are no doubt correct, since the exterior is dried before the interior, and the inside is often discolored and rotten in consequence. The knowledge of this fact led the Russians, when rhubarb came by way of Kiachta, to enlarge the string holes or to pierce the center with a large hole to ascertain its soundness. For the same reason pieces split open are shown in the rhubarb chests at drug sales in this country. On the other hand, the rhubarb collected about Sungpan, where the climate is drier, is trimmed and cut up and then hung up under the rafters and eaves of the houses to dry. The rhubarb from this locality, as well as that of N. W. Szechuen, generally finds its way overland to Chungpa and Mien-chu, and thence by boat to Chungking. Rhubarb is occasionally cultivated in the mountains of Hupeh and West China, as at Mount Ua, but the cultivated article is considered inferior to the wild. All rhubarb that comes *via* Hankow is classed as Szechuen rhubarb, and Mr. Wilson is of opinion that it is all produced by *R. officinale*. But the rhubarb in the north-west of Kansuh and the Kohonor district is, according to Przewalski, the product of *Rheum palmatum*, var. *Tanguticum*, growing at 10,000 ft. in ravines facing north, where the soil is loamy, and not on bare mountain slopes.

Rhubarb is also collected in Manchuria a specimen of which, obtained at Kiaochow in the Shantung province, was recently presented to the Museum by Mr. J. B. Martin, a missionary in that district. It does not present the appearance of the Shensi rhubarb, is only roughly trimmed, and appears to have been dried by artificial heat, the end of the round and the inner side of the long piece being concave. The veining is less black than in the root of *Rheum officinale*, and the diameter of the round pieces is less than would be expected in roots of the age of six to ten years. Concerning the plant that yields Shensi rhubarb no accurate information is as yet available.—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 80.

Rumex Ecklonianus, Meis.—*Constituents of the Herb*.—Tutin and Clewer have investigated the constituents of the herb of *Rumex ecklonianus*, a plant indigenous to South Africa, where it is reputed to have medicinal properties. An alcoholic extract of the herb, when distilled with steam, yielded a trace of a substance which formed yellow prisms, melting at 159° C., together with a small amount of essential oil. The non-volatile constituents of the extract consisted largely of brown resinous matter, but the following definite substances were also isolated: Ceryl alcohol; a phytosterol, $C_{27}H_{48}O$ apparently identical with rhamnol; palmitic, stearic oleic, linolic, and *isolinolenic* acids; a small amount of ipuranol,

$C_{22}H_{30}O_2(OH)_2$; kæmpferol; chrysophanic acid; emodin; and emodin monomethyl ether; together with traces of other crystalline substances and large amounts of inorganic salts. A sugar which yielded *d*-phenylglucosazone was also present in small amount, but no evidence could be obtained of the presence of a glucoside. The emodin monomethyl ether which was isolated was identical with that obtained by Perkin and Hummel from *Ventilago madrasapatana*, and with that prepared synthetically by Jowett and Potter. The dimethyl ether of chrysophanic acid was prepared, and obtained in the form of yellow prisms, melting at 190° C.—Contribution from the Wellcome Chemical Research Laboratories, in Proceedings of the Chemical Society; from Chem. & Drugg., Dec. 25, 1909, 971.

CHENOPODIACEÆ.

Phytolacca Abyssinica—*Pharmacology*.—Dr. G. D. Dawson's investigation of *Phytolacca abyssinica*, which occurs chiefly in Abyssinia, Madagascar, South Africa, and Australia, shows that it contains a saponin and an alkaloid. Its action is considered to depend on saponin, while the alkaloid has a distinctly harmful influence on the heart, so that a product of the drug containing the saponin, but free from the alkaloid, would probably be a good preparation for clinical use. The saponin is regarded as the principle which may cause the drug to be useful as a cardiac tonic.—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 81; from Med. Chron. Nov., 1909, 71.

PRIMULACEÆ.

Primula Officinalis—*Glucosidal Constituents as the Root*.—A. Goris and M. Mascré find that the fresh root of *Primula officinalis*, Jacq., when crushed, emit at first an anise-like odor, changing later to an odor reminding of methyl salicylate. An examination of the root revealed the presence of two new glucosides, *primverin* and *primulaverin*, together with a specific enzyme, *primverase*, which is apparently characteristic of the *Primulaceæ*, and not identical with either emulsin, myrosin, or betulase. Both glucosides are crystallizable and readily soluble in water and in alcohol, but differ in their solubilities in absolute alcohol and in absolute acetic ether—the latter solvent being utilized for their separation from each other by fractional crystallization.—Pharm. Ztg., lv (1910), No. 12, 120; from Chem. Zentralbl., 1910, No. 3.

SCROPHULARIACEÆ.

Digitalis—*Historical, Chemical, and Clinical Review*.—At the meeting of the Minnesota Pharmaceutical Association, 1909, Dr. Edgar D. Brown presented a paper covering historical, chemical and clinical observations concerning this important drug, which will be consulted with interest and profit by medical men as well as pharmacists in Proc. Minn. Pharm Association, 1909, 74–80.

Digitalis Standardization.—In a paper presented to the Association at Los Angeles, Worth Hale, a member of the staff of the Hygienic Laboratory at Washington, discusses very interestingly the factors that are concerned in the standardization of digitalis leaves and preparations (see "Proceedings," 1909, 768-773).

Linaria Striata—*Presence of a Cyanogenetic Glucoside.*—E. Burquelot has determined that the presence of at least one glucoside is indicated by the biological method in *Linaria striata*. The amount of hydrocyanic formed as a hydrolysis product with emulsin is considerable, being equivalent to 0.1478 per mille of the fresh plant. Benzaldehyde occurs as well, accompanying the prussic acid in the distillate. The amount of glucose formed by hydrolysis is greater in proportion to the hydrocyanic acid than is known to result from the decomposition of any other cyanogenetic glucoside. It is probable, therefore, that besides this, a second glucoside occurs in the plant, which does not give hydrocyanic acid as well as glucose when hydrolyzed.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 701; from Journ. de Pharm. et Chim., 30 (1909), 385.

Veronica—*Glucosidal Constituents in Several Species.*—J. Vintilesco has determined the presence of glucosidal bodies in *Veronica officinalis* and *V. chamædrys*, in addition to a sugar, hydrolyzable by invertin, a glucosidal body which is split up by the action of emulsin. The glucoside is apparently identical in both plants, and is found most abundantly during the growth of the plants, being diminished after maturity and by drying. The plants also contain soluble ferments, exerting their activity on cane sugar as well as on amygdalin and on salicin.—Pharm. Ztg., lv (1910), No. 20, 204; from Journ. de Pharm. et Chim., 1910, No. 4.

SOLANACEÆ.

Solanaceæ—*Influence of Cultivation on Alkaloid Content.*—It is usually assumed that the active constituents are more abundant in wild-growing plants than in the cultivated. J. Chevalier, however, finds the assumption to be erroneous, and that the reduction of activity is solely due to the fact that the cultivation is carried out without regard to the natural condition and nature of the soil. Under proper conditions, cultivated plants are at least equal in strength to the wild grown.—Pharm. Ztg., lv, (1910), No. 39, 397; from Compt. rend., 150, 344.

The "Wonderberry" Plant (Solanum Nigrum?)—*The bearer of an Edible Fruit.*—E. M. Holmes calls attention to the fact that the black berries of *Solanum nigrum* or rather of a luxuriant form of the plant, asserted to be a *hybrid*, introduced by Luther Burbank under the name of "wonderberry," have been eaten as a fruit in some parts of the United States, and that this particular plant has found its way into England.

How far this cultivated form differs botanically from the ordinary weed of the gardens, has not been clearly defined, and it is possible that in some cases the ordinary wild form has been substituted in commerce for the "wonderberry." This brings up the question of the reputed poisonous qualities of these berries, about which considerable doubt exists amongst horticulturists and amateurs. So far as the evidence goes the berries have very rarely been credited with producing poisoning, and it is possible that in these cases the berries may not have been correctly identified. Moreover, while it is certain that *solanine* produces symptoms of poisoning, and was first discovered in *Solanum nigrum*, the poisonous effect of the berries has so far only been noticed, and this effect may be due to idiosyncrasy, since the amount of solanine present in the berries is estimated at 0.3 per cent., and experiments show that it requires 0.1 Gm. of solanine per kilogram of weight to kill a rabbit.—Pharm. Journ. and Pharmacist, Octob. 2. 1909, 422.

Belladonna Leaves—Loss in Drying and Alkaloidal Content.—J. G. Roberts reports the result of experiments made with fresh belladonna leaves cultivated at Fox Chase Pa., which shows a loss of 60 per cent. on drying in vacuo at 45° C, and, very unexpectedly, that the whole leaves with stems contained slightly more alkaloids than the leaves without stems and midrib, as shown by the following figures: Whole leaves, with stems *undried*, 0.096 per cent; *dried*, 0.285 per cent. Leaves, without midrib and stems—*undried*, 0.080 per cent.; *dried*, 0.239 per cent. These results are not in accordance with assays reported by other operators.—Proc. Penna. Pharm. Assoc. 1909, 182.

Belladonna Leaves—Adulterations with Scopolia Leaves.—John Moser, Jr., calls attention to the frequent adulteration or substitution of belladonna leaves by the leaves of *Scopolia carniolica*, which resemble the genuine drug rather closely, but are readily detected if any of the fruit is present, this being the most characteristic feature. The author describes the distinctive character of the two drugs, and mentions that the alkaloidal content may or may not be abnormally high in a sample of belladonna leaves adulterated with scopolia leaves.—Amer. Journ. Pharm. Dec. 1909, 578-579.

Belladonna Fruit—Percentage of Alkaloids in the Ripe and Unripe Berries.—In view of the liability of belladonna berries being eaten by children during the season when the fruit reaches maturity, J. H. Williams has determined the alkaloidal content of the fresh berries, both ripe and unripe, selecting two samples of each, these samples were crushed in a mortar and then extracted completely. The several extracts were then estimated for alkaloidal content, and from these figures the percentage of alkaloid in the fresh berries calculated. The following results were obtained:—

Sample No. 1	Ripe berries	0.132 per cent. alkaloids
Sample No. 2	Ripe berries	0.107 per cent. alkaloids
Sample No. 3	Unripe berries	0.118 per cent. alkaloids
Sample No. 4	Unripe berries	0.129 per cent. alkaloids

From these figures it will be seen that the percentage of alkaloids present in fresh berries either ripe or unripe of *Atropa belladonna* ranges between the limits of 0.107 and 0.132 per cent.—Pharm. Journ. and Pharmacist, Octob., 16, 1908, 473.

Stramonium—Assay of Leaves Before and After Flowering.—H. W. Eakle collected stramonium leaves from plants, full grown but before flowering, and from plants after flowering but before deterioration, and assayed tinctures prepared from these after drying, and from leaves obtained in the wholesale market with the time of collection not stated. The first specimen assayed 0.0176 per cent. mydriatic alkaloids, the second 0.02048 per cent., and the third (the purchased sample) assayed 0.0324 per cent. of alkaloids.—Amer. Journ. Pharm., May, 1910, 242.

Tobacco—Composition and Toxicity of the Smoke.—K. B. Lehmann distinguishes two currents of smoke; the principal, caused by the aspiration of the smoker, and the accessory, which occurs at the ignited end of the cigar or cigarette. The latter represents one-fifth of the total smoke. From 80 to 98 per cent. of the total nicotine present in cigars, and 95 per cent. of that in cigarettes, passes into the smoke. The pyridine eliminated is from one-fourth to one-third of the total formed by combustion. Cigar smoke contains more ammonia than that of cigarettes. The smoke which enters the mouth contains from 1 to 6 per cent. of carbon monoxide, but this has no influence on its toxicity. Nicotine is the chief poison, from 16 to 18 per cent. of the total nicotine of strong cigars, and from 10 to 12 of that from mild ones being absorbed by the smoker. Cigarettes are less toxic because the accessory current of smoke is greater. Cigars cut up and smoked in a pipe are more toxic than when consumed in the ordinary manner, because the principal current of smoke is greater under these conditions.—Pharm. Journ. and Pharmacist, Sept. 18, 1909, 365; from Arch. Hygiene, through Nouv. Remèdes, 26, (1909), 299.

Tobacco—Condition of Nicotine in Cigar Smoke.—To determine the question whether the greater part of the nicotine in cigar smoke exists in a free state, or combined with organic acids, I. Tóth has aspirated through a special apparatus the smoke of 300 cigars, and determined the nicotine, both free and combined. It was found that the total organic bases, calculated as nicotine, amounted to 8.786 Gm., while the bases combined with organic acids only totalled 0.661 Gm. In cigar smoke, therefore, 93 per cent. of the total nicotine exists in the free state.—Pharm. Zentralh., 51 (1910), No. 5, 92; from Chem. Ztg., 1909, 866.

ACANTHACEÆ.

Andrographis Paniculata, Nees—*A Remedy in Kidney-Gravel*.—Dr. M. Buysmann recommends an infusion of the leaves of *Andrographis paniculata*, Nees, as an excellent remedy for kidney-gravel. The plant grows wild and is also cultivated in Java.—Apoth. Ztg., xxiv (1909), No. 94, 885.

LABIATÆ.

South African "Snake-bite" Plants—Problematic Efficacy.—G. E. Oliver says that of plants used as remedies for snake-bite in South Africa by the natives about half a dozen are pre-eminent, and of these two species of *Leonotis* and one of *Teucrium* may be mentioned as the most important. Much curiosity existed about the identity of these before Andrew Smith was able in his work to reveal their botanical source. Much importance was formerly attached to the discovery of these plants, especially in view of the numerous supposed cures which had been effected by their means from the bites of most deadly snakes. The belief that they actually do act as antidotes is very widely held, and especially by Europeans who have lived among natives and had opportunities of examining their customs. To doubt the matter would bring ridicule on the head of the sceptic. The three plants mentioned as the most important snake-bite remedies are

Leonotis ovata (Dutch, "Klip dogga").

Leonotis Leonurus (Kaffir, "Umfinca fincane"), and

Teucrium africanum (Kaffir, "Ubu-Hlungu," "Benyushu").

The first of these (illustrated in the original) differs from *Leonotis Leonurus* only in having ovate instead of oblong leaves, a smaller number of whorls of flowers (which are also slightly different in color), and in its shorter habit of growth. They belong to the natural order *Labiata*, and both, especially *L. Leonurus*, would adorn any garden with their tall half-woody stems bearing whorls of handsome orange-red flowers. In their application for snake-bite, however, care (so say the authorities) must be taken to distinguish between them, as it is the leaves of *Leonotis ovata* which are used and the root-bark of *Leonotis Leonurus*, an infusion being made in both cases. The former is more esteemed in viperine bites and the latter in colubrine. It is not easy to understand how these plants came to be used for the purpose for which they are noted. The leaves of *Leonotis Leonurus* appear to contain a principle similar to that of Indian hemp, and are occasionally smoked by Hottentots as a substitute for the wild hemp, producing intoxication and delirium. The leaves are not the part used, however, for snake-bite, and the root-bark from a cursory examination appears innocent of any properties other than would be possessed by a hundred other common roots.

Teucrium africanum is a low-growing shrublet (also shown in the original paper) with white labiate inconspicuous flowers and lobed leaves.

The plant is somewhat bitter to the taste and has a pungent odor characteristic of many English labiates when bruised. Considerable quantities of a decoction can be given without any apparent effect, and it is difficult to believe, without some scientific demonstration to the contrary, that this or the preceding could contain anything in the way of an active ingredient subtle enough to nullify or mitigate the deadly effect of snake-venom. Until some rational explanation of their action is forthcoming no medical man would be inclined to trifle with life where serum, or, at any rate, potassium permanganate or ipecacuanha, is accessible; and even these are said to be of no avail where a full dose of poison has been injected by a snake in normal health.—Chem. and Drugg., May 21, 1910, 90-91.

Flores Lamii—Yield on Drying.—A correspondent—M. R. in E.—calls attention to an incorrect statement in the drying-table of the "Pharmaceutische Kalender," regarding the yield of dry substance from the flowers of *Lamium album* L. According to that semi-official authority 5 p. of the fresh flowers should yield 1 p. dried, whereas, in the experience of the writer the yield of properly dried flowers, during the present dry year, was 1 p. from 7 parts of fresh flowers.—Pharm. Ztg., lv (1910), No. 44, 449.

Lavender and Spike—Varieties Grown in the District of Grand-Serre (Drôme).—Lamoth describes the varieties of lavender and spike oils produced in the district of Grand-Serra (Drôme), and advises the establishment of lavender plantation in the mountainous regions of that district. He classifies the varieties of plants grown, as follows:

1. The coarse or bastard lavender, a hybrid of *Lavandula latifolia* and *L. officinalis* var. *fragens*, which is fairly common in the neighborhood of Lyons, and yields a coarse inferior oil.
2. The medium lavender growing at a higher elevation and *L. officinalis* var. *fragens*. This yields an oil deficient in fineness.
3. The fine lavender growing at the highest altitudes and distinguished as *L. officinalis* var. *delphinensis*.—Chem. & Drugg. Jan. 29, 1910, 151.

Peppermint—Cultivation in Different Countries.—As it is possible to introduce the cultivation of peppermint to advantage in many British Colonies, the *Bulletin of the Imperial Institute* (7 [1909], 184) published for general information a review on the cultivation of the peppermint plant and the production of the oil in the various countries concerned. As is well known, the largest quantities of peppermint oil are produced in the United States, Japan, France and England, smaller quantities being also obtained in Germany, Italy and Russia. The oil distilled in America and Europe is derived from varieties of *Mentha piperita*, while the Japanese oil is obtained from *Mentha arvensis*. Two varieties of peppermint are specially known, the so-called "black mint" (*Mentha piperita* var. *vulgaris*) and the "white mint" (*Mentha piperita* var. *officinalis*). The first-named is the hardier and produces a larger proportion of oil; the

latter yields less oil but of finer quality. The particulars covered by this review must be consulted in the original, a brief abstract being accessible in Schimmel's Semi-An. Rep. Octob., 1909, 100-101.

Java Patchouli Leaves—Oil Content in Different Stages of Development.—Continuing his investigations on the oil content of patchouli leaves in different stages of development, de Jong has made investigations of Java patchouli leaves similar to those made last year with Singapore leaves (see Proceedings, 1909, 324). These investigations have led to results similar to those obtained with Singapore leaves; the oil content increases up to the third pair of leaves counting from the top of the branch, and then gradually decreases. The comparative distillations which de Jong has carried out on the present occasion with material which had been submitted to various kinds of preliminary treatment are of particular interest. Both Java and Singapore leaves were employed. In one experiment he used quite fresh leaves; in another dried leaves; in a third fermented leaves; the quantity being the same in every case, calculated for green material. The stalks had been removed before the experiment, as they contain only little oil. The leaves were dried in shady places, being spread out in a layer 5 Cm. high, which was turned over daily until the leaves were quite dry and brittle. For the purpose of fermentation de Jong first half-dried the leaves and then placed them on layers forming a heap, which was covered with bamboo matting (*Telampa*), weighed down with stones. The leaves were mixed together every day in order that the fermentation might proceed as uniformly as possible. The process was continued until the temperature inside the mass of leaves did not exceed that of the surrounding atmosphere. According to the degree of moisture of the leaves the maximum temperature observed was from 35° to 52°. A mouldy odor was usually observed, but this was removed by spreading out the leaves at the end of the fermentation process and only distilling them a few days later.

The distillation was carried out by steam (3 to 4 atmospheres). In every case the leaves, after being distilled, were freed from water by pressure, dried, and again distilled. The quantity of oil obtained from green leaves was very much smaller than that from dried and fermented leaves. The following table, showing the yield obtained by de Jong from Java leaves, is of interest :

Conditions of the leaves	Quantities worked calculated for green			
	material	1st distillate	2nd distillate	Total distillate
Fresh.....	70 kg	38 Cc.	114 Cc.	152 Cc.
Fermented...	70 "	375 "	30 "	405 "
Dried.....	70 "	360 "	49 "	409 "
Dried.....	70 "	315 "	69 "	384 "
Fermented...	70 "	350 "	28 "	378 "
Fermented...	70 "	359 "	28 "	387 "

From the above it is clear that it is quite useless to work up green leaves, because they only yield very little oil, and even in this case the principal quantity was obtained from the second distillation, that is to say, after the leaves had been dried. Much more considerable outputs, on the other hand, are obtained from dried and fermented leaves, almost the total oil contained in them being yielded by the first distillation, the second producing comparatively little oil. The total quantity of oil in dried and fermented leaves is about the same. As regards Singapore leaves, similar conditions prevail. In the case of a single distillation, 24 kilos of the leaves in a green state produced 20 Cc. oil, but after drying they yielded 77 Cc., and after fermentation 86 Cc. The small yield of Singapore as compared with Java leaves is due to the fact that in the former case the distillation took place at atmospheric pressure only. Schimmel's Semi.-An. Rep., October, 1909, 92-94; from "Teysmannia," 1909.

BORRAGINÆ.

Alkanet—Origination of the Coloring Matter.—Ella Eriksson, after a brief description of alkanet root (*Alkanna tinctoria*, Tausch., *Anchusa tinctoria*), communicates the results of her studies on the occurrence and origination of the coloring matter, alkannin, on which authorities differ—some considering that it originates in the cortex cavities, while others find that it also occurs in the cell-walls. The authoress finds that this coloring matter invariably originates in the cell-content and does not penetrate the walls of the cell. Even in the germ-root isolated epidermal cells and the hairs belonging to them have a red color. These isolated colored cells combine at first to form a red longitudinal streak of the width of the single cell; then a two- or three-rowed layer of normal cork, containing no coloring matter, is formed on the inner side of the colored cells. In subsequent stages, after the entire primary cortex has been detached, both cork and coloring matter are formed in much greater abundance. It is noteworthy that, apparently, the formation of the coloring matter depends on the rupture of the tissues, for in all places in which it occurs, not taking into account the epidermis, the tissues are found to be more or less lacerated. The author infers from this that it is the function of the coloring matter to protect the wounds produced by the rupture of the tissues.—Pharm. Ztg., lv (1910), No. 48, 491; from Ber. d. D. Chem. Ger., 1910, No. 4.

BIGNONIACEÆ.

Sesame Oil—Pharmacopœial Substitution for Olive Oil in Galenical Preparations.—G. P. Forrester says that in view of the unsettled condition of the olive oil market it is interesting to note that many recent Pharmacopœias have considered the question of introducing sesame oil as a substitute for olive oil. The choice is certainly justified, as sesame oil pos-

sesses good keeping properties and has a pleasant taste, while the extensive cultivation of the seed in India, the Far East, Palestine, Africa, and also in Southern Europe, the rapid growth of the plant (which in many cases gives a double harvest annually), and the large quantity of oil thereby available, render this product less liable to market fluctuations. At present sesame oil is official in the Pharmacopœias of Japan (1907), Hungary (1909), Servia (1909), Switzerland (1907), Austria (1906), Croatia-Slavonia (1901), Russia (1902), and Holland (1905). In the Belgian Pharmacopœia of 1906, under "*Oleum Officinale, Huile Médicinale*," it is stated that any non-drying oil employed for alimentary purposes may be used, such as almond, olive, sesame, nut, arichis, cottonseed, maize, etc., oils. In the Indian and Colonial Addendum to the B. P., sesame oil is official instead of olive oil in India, the African Colonies, the Eastern Colonies, and the North American Colonies—a considerable portion of the British Empire. Curiously enough, it was dismissed from the United States Pharmacopœia of 1905, although it was contained in the previous edition. The author enumerates and gives the formulas for ointments, liniments and plasters of the Austrian, Hungarian, Russian, Croatia-Slavonian, Dutch, Swiss, and Japanese Pharmacopœias, in which sesame oil has been substituted for olive (see *Unguenta* under "Pharmacy").—Chem. & Drugg., April 16, 1910, 61.

GENTIANACEÆ.

Gentian Root—Influence of the Method of Drying on its Constituents.—Experiments made by E. Bourquelot and M. Bridal demonstrate that the wide difference in the composition of fresh gentian root and the dried root of commerce must be attributed to the action of ferments. The drying process *per se* contributes but little to the change. At all events, by adopting a rational method of drying, such as is employed for other medicinal drugs (drying by air), dry gentian root may be obtained which yields a powder containing the same substance—or at least the same quantities of glucoside and sugar—as does the fresh root. Such a powder, in fact, may be used with advantage for the preparation of gentiopicroin, for which heretofore the fresh root was considered necessary.—Pharm. Ztg., lv (1910), No. 18, 181; from Journ. d. Pharm. et de Chim., 1910, No. 4.

Gentian Root—Adulteration with the Rhizome of Rumex Alpinus.—W. Metlacher calls attention to instances of admixture of the dried rhizome of *Rumex alpinus* with gentian root. The structure is necessarily quite distinct from that of the true drug, although superficially it might be considered to resemble the root of *Gentiana pannonica*. The upper portion shows the scars of the fallen leaves, and the lower part the marks of the rootlets; the color is reddish-brown, and it has not the aromatic odor of gentian; its taste is astringent and bitter, quite distinct from that of the true drug. The application of a drop of caustic alkali to the freshly-cut

surface causes the production of a deep red color, due to the presence of a methylantraquinone. Gentian root does not give this reaction. The microscopical characters of the adulterant are minutely described and figured.—Pharm. Journ. and Pharmacist, Feb. 26, 1910, 237; from Pharm. Post, 47 (1909), 838.

Chlora Perfoliata.—*Occurrence of Gentiopicrin*.—The intensely bitter taste of all parts of *Chlora perfoliata*, led Em. Bourquelot and M. Bridel to the conjecture that this plant, belonging to the Gentianaceæ, might contain a glucoside similar to that contained in gentian. They have experimentally proven this to be the case and have demonstrated the presence of *gentiopicrin* in the aqueous extract of plants collected during the flowering period, from which they succeeded in isolating it in a condition necessary to establish its identity. Incidentally they find that the *gentiopicrin* content is reduced in plants collected during the fruiting period.—Pharm. Ztg., lv (1910), No. 20, 204; from Journ. de Pharm. et Chim., 1910, No. 3.

APOCYNACEÆ.

Apocynum Androsæmifolium L.—*Volatile Oil, etc., from the Rhizome*.—C. W. Moore has subjected the rhizome of *Apocynum androsæmifolium*, L., to thorough proximate examination and has isolated a series of interesting bodies, among them a volatile oil, aceto-vanillone, and a new glucoside (aceto-vanillone glucoside) to which he gives the names of "androsin." The volatile oil was obtained by steam distillation from the alcoholic extract of the rhizome in a yield of 0.016 per cent. of the drug. It is pale yellow, has a strong persistent odor, and gave the following constants: sp. gr. $\frac{20}{15}$ 0.948; b. p. 130° to 250° C.; opt. rotation + 0° 50'. It gave a strong furfural reaction. The aceto-vanillone (see apocynin, Proceedings 1909, 390) was detected in the distillate, but was obtained in considerable proportions from the non-volatile part of the alcoholic extract, and partly also from the aceto-vanillone glucoside, *androsin*, to which the author assigns the constitutional formula $\text{CH}_3\text{CO.C}_6\text{H}_5\text{OCH}_2\text{O.C}_6\text{H}_{11}\text{O}_6 + 2\text{H}_2\text{O}$. The new glucoside dissolves readily in hot water and in hot dilute alcohol and, being hydrolized by emulsin, it is shown to be a β -glucoside.—Schimmel's Semi-An. Rep. Oct., 1909, 24; from Journ. Chem. Soc., 95 (1909), 734.

Adenium Hongkel, D. C..—*A Poison Plant of the French Sudan*.—Em. Perrot and M. Leprince report the results of the chemical examination of floral parts of a plant used by the natives of the Upper Senegal, under the name of "Kidi-Saramé," as a medicine and poison, which has been identified as *Adenium Hongkel, D. C.* The very poisonous hydro-alcoholic extract of the blossoms gave no reaction for alkaloids. Presuming that the poisonous component was of a glucosidal nature, the extract was exhausted with chloroform, the chloroform evaporated, the residue dissolved

in 95 per cent. alcohol, and the alcoholic solution precipitated with water. Repeating this treatment with chloroform, alcohol and water several times for the purification of the precipitate, a light yellow amorphous powder, melting at 84° - 85° was finally obtained, which, however was not hydrolyzable by the usual methods and therefore not a glucoside. The substance is violently sternutatory and a powerful heart poison.—Pharm. Ztg. lv (1910), No. 30, 304; from N. Chem. Zentralh., 1910, No. 9.

Nux Vomica.—*Source of Adulteration from Australia*.—G. Planchon and A. Juillet observe that the name "coroso" has been originally applied to the seeds of *Phytelephas macrocarpa*, commonly known as the "ivory-nut," which is largely used for making buttons. This has recently been detected on the Continent as an adulterant of powdered nux vomica, as pointed out by them (see succeeding abstract): but large and increasing quantities of so-called Australian "coroso" are now imported into Hamburg. Since *Phytelephas* is not a native of that country, and the Australian seeds, although possessing an ivory-like albumin, have very distinct macroscopical characters, differing from those of the true ivory nut, it was sought to identify their botanical origin. This is now traced to *Metroxylon nitese*, which also is not indigenous to the Australasian continent, but is a native of the Fiji Islands. Australia is only an intermediate port of shipment of the nuts, which originally come from the Polynesian islands to Australia, and are sent thence to Europe. The histology of this nut is fully dealt with and figured in the original paper, published in *Réport. de Pharm.* 22 (1910), 97.—Pharm. Journ. and Pharmacist, April 9, 1910, 455.

Nux Vomica.—*Adulteration of the Powder with Negrito Nuts*.—Having recently observed an adulteration of powdered nux vomica with olive kernels (see Proceedings, 1909, 181), Juillet, in collaboration with Professor Planchon, devoted some attention to the adulteration of this drug and have determined that notwithstanding the low commercial value of nux vomica the powdered drug was in most instances adulterated. In addition to well-known adulterants the authors have determined one not hitherto observed, this consisting of the endosperm of the seeds of *Phytelephas macrocarpa*, R. P. (*Elephantusia macrocarpa*, W.), commonly known as "negrito nut" or "vegetable ivory"—an adulterant which lends itself admirably to the purpose, since the endosperm of these seeds is both odorless and tasteless, is a waste-material of no commercial value, and notwithstanding the hardness of the intact seeds is readily reduced to powder when in form of chips. The new adulterant is however easily recognized under the microscope by the pronounced structural distinction from nux vomics.—Pharm. Ztg., liv (1909), No. 55, 538; from *Rép. de Pharm.* 1909, No. 6.

Spigelia.—*Sophistication with Phlox Roots*.—John Moser, Jr., in an examination of nine samples of so-called pink-root, found two of the sam-

ples to be genuine *Spigelia* of fair quality, one of them to consist entirely of *Ruellia*, while five of them consisted entirely of roots which, from their microscopic structure and from the macroscopic appearance, correspond very closely to the available data on *Phlox*. This, on the whole, bears a rather close resemblance to *spigelia*, and like *spigelia*, its matted roots are apt to contain much dirt. The remaining samples consisted of about equal parts of the same root and of another which bore no resemblance to it. The author expresses the opinion that species of *Phlox*—probably *P. ovata* and *P. glaberrima*—are at present frequently collected and sold as *spigelia*.—Amer. Journ. Pharm., Dec., 1909, 577-578.

"*Pinkroot*" is the subject of a historical paper by M. I. Wilbert, which appears in the "Proceedings," 1909, 1170-1173.

Tai-tsa-ju—*A Chinese Antidote for Snake-bite*.—Gehe & Co. call attention to a new drug, consisting of the roots, rhizomes and stems of a plant which O. Tunemann has identified as being probably derived from a species of *Logania*. The drug has a reputation in China as an antidote for snake-bite, but is also used for the treatment of lepra, itch and other skin diseases. It contains a yellow coloring matter and two highly poisonous alkaloids, the identity of which has not yet been determined.—Pharm. Ztg., lv (1910), No. 39, 396; from Gehe & Co.'s Spring Report, 1910.

SAPOTÆ.

Bassia Longifolia—*A "Saponin-Digitalin" Glucoside in the Seeds*.—The seeds of *Bassia longifolia*, popularly known as "mowrah seeds," are imported in large quantities from India on account of a high yield of an excellent oil used in making the better classes of soap. Owing to the bitter taste of the residue of expression, this is valueless for economic purposes of such seed residue, such as food for cattle, for example. Attention has recently been called to the highly irritating action of this cake meal when in contact with a cut surface or with the mucous membranes of workers who were engaged in the manipulation of the meal, which has on this account become the subject of a chemical and pharmacological examination by Prof. Benjamin Moore, Fred W. Baker-Young, and Miss S. C. M. Sowton. The results of this investigation revealed the presence in these seeds of a new glucoside belonging to the saponin-digitalin group of glucosides, which the authors have named

Mowrin.—This was found to be readily soluble in water or alcohol, but practically insoluble in ether. On hydrolysis it yields, among other products not completely determined, a hexose and an organic acid, which the authors have named "mowric acid." The glucoside was obtained as a pure white product by decolorizing an alcoholic extraction of the meal with charcoal, and adding an excess of ether to the decolorized solution, collecting the precipitate rapidly on a filter, and drying over sulphuric acid—the process of solution in alcohol, precipitation by ether, and

drying being repeated two or three times. Both the glucoside and its acid derivative are poisonous when administered hypodermically, the glucoside being more powerful than the acid. One of the most interesting properties of the glucoside, inherent to a less degree also in the acid, is the powerful laking effects upon blood corpuscles in a saline suspension.—Pharm. Journ. and Pharmacist, Sept. 18, 1909, 364; from Pr. M. J.

Chicle—Character of Identity.—M. Bocquillon describes the following character of chicle as a means of identifying this gum resin, which flows naturally or by incisions from the trunk of *Achras sapota*, a tree growing in Mexico and Guatemala:—Acidity, 0; specific gravity, 1.010; entirely soluble in carbon disulphide, petroleum ether, and chloroform; insoluble in methyl alcohol. Alcohol dissolves 55 per cent.; ether, 44 per cent.; acetone, 47 per cent.; acetic acid, 50 per cent.; benzol, 65 per cent.; amyl alcohol, 27 per cent.; aldehyde, 40 per cent.; oil of turpentine, 80 per cent. On incineration it leaves 6.9 per cent. of ash composed of sulphates, chlorides, and carbonates of sodium and calcium. The new edition of the Mexican Pharmacopœia gives the following composition of chicle, according to the analysis of Prof. Uribe:—Crystallizable resin, colorless, soluble in alcohol and in ether, 45; caoutchouc, 18; sugar, 9; gum, 7; starch, 8; red coloring matter and salts, 7; water and loss, 6, all in percentage.—Pharm. Journ. and Pharmacist, May 14, 1910, 609; from Rép. de Pharm., March 10, 1910, 103.

Mimusops Djave—Economic Use of the Seeds.—E. Fickendey makes a report on the possible economic uses of the seeds of *Mimusops djave*, a tree growing in the Cameroon, whose wood is known and valued as "Cameroon mahogany." According to Bücter, the seeds are embedded in a yellow pulp when the fruit is ripe, which is a favorite food of the natives, but in the unripe or partly ripe condition the fruit contains a caoutchouc-like latex, which disappears entirely when the ripening is completed. The fresh seeds are white and odorless. The dried seeds yield up to 64.53 of a fat—"adjab butter"—of the consistence of lard, light brown in a molten condition, but congealing to a white mass, possessing great resemblance to the so-called "shea butter," and having also the same constants. It is regarded as being suitable as a food product and is particularly useful for stearin and soap manufacture. On the other hand, Krause considers the seeds to be poisonous and they are so regarded by the natives. He has prepared a saponin from them, in a crude condition, which gives all the characteristic reactions of the saponins. Nevertheless, the marc of the seeds from which the fat has been expressed may serve as food for cattle, for which they are very suitable on account of their high protein content (22.82 per cent.), if it is first extracted with hot water, which does not depreciate its food value.—Pharm. Ztg., lv (1910), No. 30, 396; from Tropenpflanzer, 16.

MYRSINÆ.

"*Lodua*" or "*Ngezi*"—*A New Taeniafuge*.—Penschke recommends the fruits of a species of *Embelia*, known as "*Lodua*" or "*Ngezi*," for the removal of tapeworm. The active constituent of these fruits is embelic acid. The fruits are administered in a crushed form, the treatment sometimes requiring one or two repetitions.—Pharm. Zentralh., 50 (1909), No. 49, 1022; from Arch. f. Schiffs. u. Tropen Hygiene, 1909, No. 21.

STYRACÆ.

Siam Benzoin—*Constituents*.—Professor Friedr. Reinitzer has made a comprehensive study of the constituents of Siam benzoin, which he contributed to the recent meeting of German Naturalists and Physicians at Salzburg. Inasmuch as benzoin exudes naturally as a milk-white body, the brown *Siaresinotannol*, regarded by Lüdy as being the principal constituent, does not pre-exist but is a product of oxidation. Siam benzoin in loose tears is perfectly crystalline. It melts at 59° C., and when heated at 40°–50° C. in the dark gradually turns yellow-red, red, brown-red, and becomes amorphous. The pure crystals, which melt at 72.8°, are monoclinic and colorless, but also become red to brown and amorphous when heated to 40°–50° C. They are composed of the benzoate of a resinalcohol which the author has named *Lubanol*, gives a green color with FeCl₃, and may by further benzoilation be converted into a new crystallizable body. The original body, *Lubanobenzoate* gives Liebermann and Salkewsky's reaction and a beautiful blue color when heated with chloralhydrate. Siam benzoin also contains a benzoate resembling Lüdy's benzœvitriol, but not identical, since it contains more oxygen, which the author has named *Siaresinol*. This crystallizes in handsome prismatic needles, melting at 279° C., and are dextrorotatory in alcoholic solution. Siaresinol produces a sodium salt which is sparingly soluble in water but may be crystallized in long handsome needles by means of which it may be isolated in a pure condition. It is not sensibly affected by oxygen, nor changed in color by heat at 40–50° C.; gives no color reaction with FeCl₃, but does give Liebermann and Salkewsky's reaction. Siam benzoin, finally, contains an amorphous benzoate, which is reddened even at the ordinary temperature, is readily saponified, subject to further benzoilation, and separable by means of CS₂ into two distinct bodies. By prolonged heating at 100° C. it is converted into Lüdy's Siaresinotannol. The author, furthermore finds that

Sumatra Benzoin originally exudes also as a milk-white substance, and that Sumatra resinotannol must therefore be regarded as an oxydation product.—Pharm. Ztg., liv (1909), No. 80, 791.

COMPOSITÆ.

Ageratum Conyzoides and *A. Mexicanum*—*Vaso-Constrictor Alkaloidal*

Constituent.—J. Chevalier has isolated from *Ageratum conyzoides* an alkaloid, forming a crystalline hydrobromide, which has marked vaso-constrictor action, similar to that of ergot, but of very low toxicity and without action on the heart. The allied *Ageratum mexicanum*, of European gardens, contains the same base, but in smaller quantity.—Pharm. Journ. and Pharmacist, June 18, 1910; from L'Union Pharm., 51 (1910), 211.

False Arnica Rhizomes—Examination and Comparison with Genuine Rhizomes.—E. M. Holmes observes that for some months past true arnica rhizome has been very scarce, with the result that other roots are mixed with it in considerable proportion, in some cases as much as 20 per cent. One of these roots was submitted to Mr. Bertram Cockburn for microscopic examination. This has twice the diameter of the true rhizome, and the transverse section shows a woody center, with radiating woody wedges and medullary rays of about equal thickness, which at once distinguishes it from arnica. The microscopic examination showed that the vessels and sieve tubes contain a yellow oily secretion, which is also present in large oil ducts placed intermediately outside the phloem, as in arnica. Only traces of inulin were observed in the sections examined. Large oblong sclerotic cells are present in the cortex of the false arnica, which afford an easy means of distinguishing it, if present in powdered arnica. The odor of the root and the tincture are very similar to that of true arnica.

The characteristics of the two rhizomes in powder may be thus described:

Arnica Montana.—Abundant parenchyma with inulin. Absence of large yellow sclerotic cells. Characteristic thin-walled multicellular brown hairs.

False Arnica.—Abundance of wood cells and vessels. Large yellow oblong sclerotic cells. Dark color of cortical parenchyma and cell contents. Traces of inulin only.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 51.

Coltsfoot—New Phytosterols in the Flowers.—T. Klobb, in the course of an investigation of the cholesterol alcohols of the *Compositæ*, has isolated two new phytosterols from coltsfoot flowers. One of these, melting at 117° – 119° C., is not yet completely examined. The other, faradiol, is characterized by the presence of two oxygen atoms in the molecule, having the formula $C_{30}H_{50}O_2$, or $C_{31}H_{52}O_2$, or $C_{29}H_{48}O_2$. Unlike the phytosterols of chamomile and of arnica, these bodies are not found in the petroleum-ether extract of the flowers, but in the alcoholic extract. Faradiol crystallizes from alcohol in large orthochromatic prisms, and from acetone in rectangular tablets. The crystals containing alcohol of crystallization melt at 209° – 211° C.; but if freed from this at 115° – 116° C., the

residual phytosterol melts at about 238°C . Its $a_D = +45.1^{\circ}$. Certain of its esters are described. These investigations show that the phytosterols of the compositæ may be classed in three groups: (1) Monovalent, lævorotatory alcohols, melting near 130°C ., crystallizing from alcohol in lamellæ, and generally forming hydrated crystals; (2) monovalent alcohols of high melting-point, crystallizing in needles; (3) bivalent dextro-rotatory alcohols, crystallizing from alcohol in large crystals melting at above 200°C .—Pharm. Journ. and Pharmacist, Feb. 25, 1910, 237; from Compt. rend., 149 (1909), 999.

Spurious Echinacea—Probable Source.—John Moser calls attention to a root of uncertain botanical origin which was offered in the New York market during the fall of 1909. The spurious root when in the entire state differs in certain features from echinacea, but yields a powder that has a very similar appearance, and in this form requires the aid of a microscopic examination. To facilitate this, the author gives a macroscopic and microscopic description of genuine echinacea root, which is derived from two closely related plants (*Brauneria purpurea* and *Brauneria palida*) and of the spurious root under consideration, which must be referred to in the original paper. It may be said, however, that the principal difference was found in the sclerenchymatous tissue, and that the isolation of the sclerenchymatous fibers by means of Schultze's macerating solution or by digestion with 10 per cent KOH solution, greatly facilitated the work and made it possible to detect minute quantities of the spurious root in admixture with true echinacea. In a note to his paper the author mentions that the characters of the spurious root examined by him are very similar to those of the root of *Parthenium integrifolium* to which attention has recently been drawn as appearing in large quantities in the St. Louis market, apparently intended as a substitute for or adulterant of echinacæ.—Amer. Journ. Pharm., May, 1910, 224-226.

Insect Powder—Active Constituent.—J. Fujitani's comprehensive investigation of the chemical constituents of insect powder confirm the views of Sato (see Proceedings 1908, 211) that the activity of the drug is due to a syrupy body for which Sato had proposed the name of pyretol, but for which Fujitani prefers the name of

Pyrethron.—It is a neutral, amber-yellow, syrupy ester, containing no nitrogen, insoluble in water, acids or alkalies, but very readily soluble in alcohol ether. It is readily decomposed spontaneously, and on saponification splits up into

Pyrethrol, $\text{C}_{21}\text{H}_{34}\text{O}$, and several acids which have not yet been well defined. Pharmacological experiments prove that the insecticidal activity and the toxicity in general of insect powder is solely due to the pyrethron, which is regarded to be a nerve muscle poison, having in some respects toxic properties similar to veratrine.—Pharm. Ztg., liv (1909), No. 71, 691; from Arch. f. exp. Pathol. u. Pharmacog. 67, No. 1.

Tanacetum Vulgare.—*Constituents of the Extract*.—A detailed examination of an extract of the flower heads of *Tanacetum vulgare*, prepared with 60 per cent. alcohol by H. Matthes and H. Serger, gave the following constituents: A brown resin soluble in ether and having a strong bitter taste; a resin insoluble in ether but soluble in alcohol; another resin insoluble in alcohol; and fat, which contained glycerides of stearic, daturic, and lycopodium-oleic acids, and of an acid to which the name tanacetum-oleic acid is given, with traces of linolic, linolenic, and oleic acids; the unsaponifiable portion was found to contain phytosterin, melissyl alcohol, an unsaturated hydrocarbon, and other constituents that were not identified. The extract was light-brown, hygroscopic, and only partly soluble in water or absolute alcohol, but readily dissolved by dilute caustic alkalies.—Arch. d. Pharm., 247, (1909), No. 6, 418-431.

RUBIACEÆ.

Cinchona.—*Fungoid Disease in Java*.—Dr. Rant gives an interesting account of a fungoid disease, known locally as "Djamoer Oepas," which attacks cinchona in Java. This disease is of great importance in connection with cinchona planting, but it is also found in coffee, tea, cocoa, nutmeg and Para rubber, and consequently interests planters in many parts of the world. The author states that cinchona suffering from the disease shows four fungoid growths, viz., (a) an incrustation (white in the dark, pink on exposure to light) which is *Corticium javanicum*, Zimm.; (b) small whitish nodules, made up of typical fungoid hyphæ; (c) white translucent threads, forming a tissue resembling a cobweb; and (d) a mold, which is *Necator decretus*. A series of photographs of these forms is given in the original. Of the two typical forms, viz., (a) and (d), the first is generally found on the upper surface of cinchona branches and the second on the lower surface, but it is surmised that all four are forms of one and the same fungus.—Chem. & Drugg., Nov. 13, 1909; from "Teysmannia," 1909, 20, 409.

Cinchona.—*Improved Method of Assay*.—Experiments made and described by H. Engelhardt and H. W. Jones lead them to suggest that the U. S. P. process for assaying cinchona bark might advantageously be changed, and they strongly recommend using the Keller-Fromme method in conjunction with the Panchaud titration of the alkaloids as modified by them. In case the determination of the ether-soluble alkaloids is again adopted the above suggested assay method should be modified and another factor for the alkaloids has to be used. This is not very difficult, inasmuch as in most of the cinchona barks the relation of the percentage of the four principal alkaloids of the drug is almost constant.—Amer. Drugg., Jan. 10, 1910, 5.

Pseudocinchona Africana.—*Preparation and Characters of the Alkaloidal Constituents*.—E. Fourneau describes the crystalline alkaloid from

the bark of *Pseudocinchona africana*, A. Cher., a rubiaceous plant having many affinities to the genus *Coryanthe*. The coarsely powdered bark is extracted with 5 or 6 times its weight of cold very dilute sulphuric acid, the solution is saturated with sodium carbonate, and the precipitate formed is collected and dried. It is then boiled with acetic ether, the ethereal solution filtered, concentrated in the water-bath and ether added. This precipitates a deep yellow crystalline magma, which is recrystallized several times from alcohol, when the alcohol is obtained in magnificent anhydrous, hexagonal, colorless plates. Crystallized from 60 per cent. alcohol, it contains water of crystallization. The white crystals become colored on exposure to light; they are alkaline to litmus, soluble in boiling chloroform, very soluble in boiling methyl alcohol, ethyl alcohol, and acetic ether, but little soluble in the cold liquids; very little soluble in cold absolute alcohol, benzene, ether, acetone; insoluble in petroleum ether, water, or in presence of alkalis. The melting point is difficult to determine, but it appears to lie between 241° and 242° C. With concentrated sulphuric acid it affords a colorless solution, which becomes brown after a few minutes. In dilute sulphuric acid solution it readily reduces potassium permanganate. Acid solutions of the alkaloid give a voluminous white precipitate with alkalis, insoluble in excess of the reagent and in ether, and becoming very quickly crystalline. The base is strongly lævorotatory— $[\alpha]_D^{25} = -125^{\circ}$ C. Analysis of the substance shows that it has the formula $C_{21}H_{24}N_2O_3$, which is the same as that of quebrachine, but in spite of many points of resemblance between the two alkaloids, they should be considered as different, if only because of the rotatory power, which is dextrogyre in the case of quebrachine. Various salts of the base have been prepared and are described in the original paper.—Pharm. Journ. and Pharmacist, May 21, 1910, 646; from Bull. des. Sci. Pharmacol., April, 1910, 190.

Coffee—Content of Caffeine in the Raw and Roasted Seed.—K. L. Lendrich and E. Nottbohm found, as the result of the analyses of 32 samples of coffee, the percentage of caffeine to be between 1.05 and 2.83 per cent. for raw coffee, and between 1.09 and 2.95 per cent. for roasted coffee, calculated in both cases on the dry material. Abyssinian Mocha contains the least caffeine, and Canzeno the most. The latter and Euconga coffee both contain over 2 per cent., and are derived from wild plants growing in Portuguese Africa. The highest percentages found in cultivated coffee were between 1.65 and 1.68. Only a few samples contained less than 1 per cent. The slightly higher percentage of caffeine found in roasted compared with raw coffee is due to loss of volatile matter and moisture during the process. Actually a portion, from 1.5 to 8.53 per cent., of the total alkaloid present is lost in the process.—Schweiz. Wschr. f. Chem. u. Pharm., xlvii (1909), No. 45, 692.

Coffee—Extraction of Caffeine Direct from the Green Berries.—L. Seissir has devised a method for removing the caffeine from coffee. About 5 kilos of unroasted coffee berries are placed in a closed centrifugal drum which is surrounded by a hot-water jacket. After the addition of about 15 kilos of ethyl acetate, the drum is set in motion, so that the solvent and berries are thoroughly mixed, the temperature being maintained at 68° C. At the end of three hours the solvent is drawn off, and replaced by a further quantity of about 10 kilos, and the mixing and extraction are continued for a further two hours. The ethyl acetate is then run off, the berries are heated to 100° C. to remove the last traces of solvent, and finally dried at 40° to 46° C., the drum being rotated meanwhile. The ethyl acetate may be recovered by distillation, and the caffeine separated from the residue. The method is the subject of a French patent.—Pharm. Journ. and Pharmacist, Aug. 7, 1909, 205; from Journ. Soc. Chem. Ind., 1909, 622.

Morinda Longiflora—Medicinal Properties and Constituents of the Root and Leaves.—E. M. Holmes calls attention to the bark and root of *Morinda longiflora* which, under the name of "Ojuologbo," have occasionally during the last ten years been sent from Sierra Leone, Lagos, and other parts of West Africa, where it is regarded as a remedy of some value. It is stated to be a gentle stimulant to the cerebral centers, acting on the kidneys, and improving digestion and nutrition; it is used as a remedy for malaria. The root and leaves of the plant have been carefully examined by Mr. Barrowcliff and F. Tutin, and the results obtained were made known in No. 77 of the publications of the Wellcome Research Laboratory. According to these authors it contains a yellow substance, melting at 290°, which is a hydroxymethoxymethylantraquinone $C_{18}H_{12}O_4$, crystallizing in yellow needles from absolute alcohol; a substance in pale yellow needles, melting at 209° C, which proves to be monomethyl ether of of alizarin, identical with that obtained from Chay root (*Oldenlandia umbellata*, Linn.) by Perkin and Hummel, and resin, etc. The leaves yielded a new crystalline alcohol, morindanol, $C_{38}H_{61}.O_3OH.H_2O$, melting at 278° C. Citric acid was found in the root, but not in the leaves. Experiments made in the physiological laboratory with extracts of the dried root and leaves upon small dogs yielded no definite effects of any kind.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 50.

RANUNCULACEÆ.

Aconitum Lacinatum—High Percentage of Alkaloid.—E. M. Holmes states that a sample of fine tuberous roots of Indian aconite (*A. lacinatum*) was presented to the Museum of the Brit. Phar. Soc. of Great Britain by Mr. J. C. Umney, who had found then to yield by the U. S. P. the rather high percentage of 0.92 per cent. of ether-soluble alkaloids. The roots

were in excellent condition.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 51.

Cimicifuga Racemosa—*Constituents of the Rhizome*.—By the use of different solvents—water, petroleum ether, ether, chloroform—Horace Finnemore obtained solutions in which he identified the following bodies contained in an alcoholic extract of *cimicifuga* rhizomes: Isoferulic (hesperetic) acid; 3-hydroxyl-4-methoxycinnamic acid (m. p. 228° C.); sugar; tannin; four crystalline substances melting respectively at 153°, 200°, 225° and 260° C.; phytosterol; palmitic acid; liquid fatty acids containing oleic and other unsaturated acids; a trace of an alkaloidal body.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 265.

Coptis Teeta—*Chinese Variety*.—The rhizome of *Coptis teeta*, is used in Sind, under the name of "mamiran," for inflammation of the eyes, and well known in India under the name of "Mishmi Tita." It is stated in "Pharmacographia" that a variety of this drug is brought from China. The Chinese, however, distinguish two varieties—the one as Hwang-lien (yellow lien), the other as Chinese lien (lien from Szechuen). The attention of Mr. Burkill was directed a few years ago to these varieties, and he has now published an account of his researches, including some particular references to certain Japanese species, since the medicine used in Japan under the name of "Oren" is referred by Tsudioka and Mural to *Coptis anemonaefolia*. Mr. Burkill, giving an account of all the known species, with illustrations of the leaves and a résumé of the literature, considers the Chinese plant, which is cultivated at Ya-chou-fu, in the center of Szechuen, and Heoupin the eastern part, as *Coptis teeta*, Wall., var. *Chinensis*. The same plant was found by E. H. Wilson to be grown in the part of Szechuen adjoining Hupeh, by Henry in N. Wushan in the same province, and by Henry Leveson on the Burmo-Yunnan boundary. Mr. Burkill is also of opinion that part of the Japanese drug is obtained from *C. brachypetala*. Of the two kinds imported overseas into India he believes one to be *Coptis teeta*, var. *Chinensis*, the other *C. anemonaefolia*. If that be so, the former probably comes from Chinese and the latter from Japanese ports. The plants, cultivated or wild, in Japan, and referred to *C. orientalis*, *C. occidentalis* and *C. occidentalis* var. *Japonica* by various authors, should, he thinks, be studied in the living state for satisfactory discrimination, since the described species resemble each other very closely.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 671; from Journ. Asiat. Soc. Bengal, 1909, 73–88.

Larkspur and Stavesacre.—The microscopic distinction of the ripe seed of *Delphinium consolida* (larkspur) and of *D. staphisagria* (stavesacre) furnish the subject of an interesting paper by Charles W. Ballard, which, together with two full-page illustrations, exhibiting the microscopic characters of the two drugs, appears in the "Proceedings," 1909, 892–896.

UMBELLIFERÆ.

Parsley Seed—Unsaponifiable Constituents of the Fat.—In the examination of parsley seed fat by H. Matthes and W. Heinz, the yellow aromatic unsaponifiable portion showed a crystalline separation. On warming with a small quantity of alcohol the crystals were left insoluble. They were readily dissolved by chloroform and benzol; less soluble in ether, petroleum ether, and acetic ether. Recrystallized in tablets from ether, it melted at 69° C., and proved to be a hydrocarbon, $C_{20}H_{32}$, *petrosilan*. It does not afford any phytosterol reactions. Another crystalline constituent was isolated from the portion soluble in alcohol, separating from the solution in hot chloroform; this proved to be *melissyl alcohol*, melting at 88° C. From the portion soluble in cold chloroform a third crystalline substance was obtained by treatment with absolute alcohol; this melted at $133-145^{\circ}$ and gave phytosterol reactions. The alcohol-soluble portion, after separating this, was a yellowish-brown liquid, with the Huebl value 111.75 and the n_D 1.5154 at 40° C. Parsley-seed fat contains about 14 per cent. of these unsaponifiable constituents.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 671; from Pharm. Berichte, 19 (1909) 325.

RUTACEÆ.

Bitter Root from Sierra Leone—Identification and Constituents.—Under the name of "Dende," the bitter root of a small tree was presented in 1906 to the Museum of the Brit. Pharm. Society by Mr. Lort. Phillips, which was obtained by him in Sierra Leone, and which E. M. Holmes provisionally identifies as *Brucea macrophylla*, Oliv. The root is used by the natives as a remedy for malaria, and at the request of Mr. Holmes has been subjected to an examination for the presence of an alkaloid by Mr. H. Finnemore, who, by suitable treatment, succeeded in extracting a yellowish-brown crystalline substance which, when purified by recrystallization from absolute alcohol, melted indefinitely between 219° and 224° C.; but no evidence could be obtained as to the nature of these crystals except that they were free from inorganic matter.—Pharm. Journ. and Pharmacist, Jan. 8, 1910, 26.

Jaborandi—New Substitution.—E. M. Holmes notes a new substitution of jaborandi leaves which in size and general appearance bear considerable resemblance to Rio Janeiro jaborandi (*P. pennatifolius*), but the leaves are rather thinner and have a tea-like odor. After a prolonged examination they were traced to the genus *Cascaria* of the N. O. Samyda-ceæ, but the large number of species of this genus made it impracticable to determine the species in the absence of flowers.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 52.

Jaborandi Leaves—Use of Chloroform for the Alkaloidal Assay.—Rupp and Zinnius having pointed out the liability of inaccuracy due to the decomposition of chloroform in the shaking-out process of assaying bella-

donna, hyoscyamus, etc., and recommended the use of ether as being free from this objection and quite as serviceable, G. Fromme mentions that ether cannot be used for the determination of pilocarpine in jaborandi leaves. In his experience, however, chloroform may be used with perfect satisfaction if the precaution is taken to distil off the chloroform immediately after shaking out the alkaloid.—Pharm. Ztg., liv (1909), No. 77, 757; from Cæsar and Loretz Ber., Sept., 1909.

Quassia—Exhausted Wood on the Market.—E. M. Holmes says that quassia wood is now largely used to make an extract which enters into the composition of various insecticidal spraying liquids. The wood after extraction has been sold as quassia of second quality at a cheap rate. A sample of such exhausted quassia was presented to the museum by Mr. V. H. Kirkham, who examined it and found that it was not easy to prove legally that it was exhausted. Mr. Holmes asked him to compare it with authentic samples for the museum, and he arrived at the following figures :

—	1 Museum P. S.	2 Bought.	3 Bought.	4 Exhausted.	5 Bark Genuine.	6 Medulla of Log.
Moisture	9.5	9.7	9.9	13.5	11.2	10.4
Aqueous Ext.	6.4	8.6	6.3	2.7	2.6	2.3
Chloroformic Ext. ...	0.7	0.8	—	0.3	0.4	—

It will thus be seen that the exhausted chips contain a larger percentage of moisture, nearly half as much again, and yield only about one-quarter of the amount of aqueous extract. The difficulty in distinguishing the exhausted from the official drug is that the bark and pith taken from a log in the museum, about 4 inches in thickness, yielded as little extract and nearly as much moisture as the exhausted quassia chips. The bark, however, could not possibly be confounded with the chips, and would not pay to collect separately, and the medulla forms too small a proportion to be worth consideration.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 51.

Xanthoxylum Capense—A Kaffir Antidote Against Anthrax.—G. E. Oliver figures and describes *Xanthoxylum capense*, a tree or shrub widely dispersed in the Cape Colony, which is chiefly interesting because of its universal use by the natives as an antidote against the ill effects of eating anthrax-diseased meat. Such meat is eaten by them with impunity, the feast being accompanied with draughts of an infusion of the root. This plant, known as “knobwood” and “wild cardamom,” is characterized by the knobs with which the stem and larger branches are set. It is from these knobs that the vernacular names are derived—*Paarde Pram* (Dutch) meaning mare’s teats. The leaves are imparipinnate, and their stalks and

nerves are usually armed with small prickles. The flowers, which are inconspicuous, are borne in panicles and are unisexual and dioecious. The fruit is a dry one-seeded capsule, dehiscent in two valves and retaining the solitary black shining seed on its inner coat. This seed remains attached long after the valves have separated and shrunk. The plant itself is very variable in size and attains the size of a large tree in a dense high forest, while in other situations it is found only as a shrub.—Chem. and Drugg., Jan. 22, 1910, 115.

Xanthoxylum Thunbergianum, D. C., var. *Obtusifolia*—*A South African Snake-bite Remedy*.—E. M. Holmes has received from Mr. J. H. Yeo, of Potchefstroom, the root of *Xanthoxylum thunbergianum*, D. C., var. *obtusifolia*—locally called "paardipvam"—which is described by Mr. Yeo as a remedy for snake bite, and as the plant belongs to a genus, some of the members of which certainly have definite physiological action, as arterial stimulants and powerful diaphoretics, it may possibly deserve attention. "The local name signifies mare's teats, because the spines of the stem of the plant become thickened at the base until they look exactly similar. For snake bite the fresh root is rasped, and about $\frac{1}{2}$ oz. of the scrapings is boiled in a pint of water down to 8 ozs. and strained. The dose of the decoction for a child of twelve years old is one teaspoonful every two hours. It has been proved to be most effective if given immediately after the patient has been bitten. Bites from all (South African) poisonous snakes, such as the puff adder, mambas, rink hals, etc., which usually cause death in from fifteen minutes to two hours, dependent upon the amount of poison absorbed, are quickly cured if the remedy be given at once, and in the case of small poisonous snakes where sufficient poison has been injected to cause serious illness, but not immediate death, it has a wonderful effect even after three days."—Pharm. Journ. and Pharmacist, Jan. 8, 1910, 25.

GERANIACEÆ.

Linseed Meal—Quick Method of Detecting Impurities.—The Bull. des Scienc. Pharmacol., 1910, No. 2, communicates the following simple and expeditious method of detecting adulterations and vegetable admixtures in linseed meal: 80–100 Cc. of benzin are poured upon 10.0 Gm. of the linseed meal, which, if pure, will remain on the bottom, whereas foreign (vegetable) admixtures, such as seed fragments, wood fragments, etc., will rise to the surface, and may be collected and weighed.—Pharm. Ztg., lv (1910), No. 28, 283.

STERCULIACEÆ.

Kola Nuts—Varieties of the Ivory Coast.—According to A. Chevalier, *Kola acuminata*, while met with in some districts of the Ivory Coast, cultivated by the Kroomen, is not a true native, having been introduced from Dahomey or from San Thomé. It is distinguished by possessing

three to five cotyledons, which form the nut. Its use and cultivation should not be encouraged, since it is of inferior quality. The trees which furnish the most esteemed nuts, those with only two cotyledons, are separable into three distinct varieties when the fresh material and growing trees are examined. They cannot be distinguished by dried herbarium specimens. One of these three varieties is *K. astrophora*, the red kola of the Ashantis. Its nuts are always red, and have two cotyledons. It is found on the Gold Coast and also on the Ivory Coast. The nuts of wild trees in the latter locality sometimes weigh as much as 70 to 90 Gm., although, when cultivated, they rarely exceed 15, or at the most 30, Gm. in weight. The second variety is *Kola alba*, a new species, the white kola of the Ngans. The nuts are at first white, then yellowish, and finally greenish after gathering. These white nuts are as highly prized as the red ones in the Soudan. The third variety, named by Schumann *K. vera*, is really a hybrid of *H. alba* and *L. astrophora*. It is the most widely spread and cultivated of all. It bears both red and white nuts on the same tree, and often in the same pod. It is not so deserving of culture as either the purely red or purely white kinds.—Pharm. Journ. and Pharmacist, April 9, 1910, 455; from Compt. rend. 50 (1910), 623.

Kola Nuts—Sugar Content and its Determination.—In order to determine the sugar content in fresh kola nuts, L. Bourdet, after the removal of the cotyledons, dried and powdered them and extracted the powder with alcohol. The alcohol is distilled off, the residue dissolved in water, the solution purified with basic lead acetate and Palein's reagent, and examined polarimetrically and volumetrically before and after inversion. The results showed a content of 0.748 per cent of reducing sugar before, and 3.252 per cent. after the inversion, calculated as glucose. The reducing sugar found before the inversion, according to its melting point and the characteristic form of the osazone prepared from it, must be regarded either as glucose or levulose, or a mixture of both.—Pharm. Ztg., lv (1910), No. 20, 205; from Bull. des Sciences Pharmacol. 1909, 650.

Cocoa and Chocolate and their uses in pharmacy are interestingly discussed by W. R. White in a paper published in the "Proceedings," 1909, 1014-1017.

TERNSTROMIACEÆ.

American Tea—Production Beyond the Experimental Stage.—J. Koch contributes an interesting paper on American tea farms in which he demonstrates that the successful cultivation and preparation of tea in paying quantities and of excellent quality has passed beyond the experimental stage. The question of cheap labor is an important factor, but it has latterly developed that, in places, there is much the same flora, the same climatic conditions, and the same cheap labor one has in the Orient. The paper contains much useful information connected with tea culture in the

United States, which must be consulted in the original. Merck's Rep. Sept., 1909, 228-229.

HIPPOCRATIACEÆ.

Gurjun Balsam.—*Constituents*.—Bacon has examined the balsam (Balao) from *Dipterocarpus grandiflorus*, known as "gurjun balsam," thus complementing an investigation made by Clover some years ago. The balsam, when distilled under atmospheric pressure and *in vacuo* yielded an oil containing a mixture of crystalline acids, of which only a part was soluble in ether. In the fraction boiling at 128 to 131° (13 mm.) a sesquiterpene was also detected which, when distilled three times over sodium, appeared in the form of a colorless oil with the following properties: b. p. at ordinary press 261 to 262.4° (standardized thermometer entirely immersed in the steam), 118 to 119° (8 mm.), $d_{40}^{30} 0.9104$, $n_{D30}^{30} + 116.4^{\circ}$, $n_{D30}^{30} 1.4956$, ester no. and sap. no., 0, mol. refr. found 65.9, calc. for $C_{15}H_{24}/2$ 69.15. The sesquiterpene, according to these data, was bicyclic and double unsaturated. Attempts to obtain clearly defined derivatives of the sesquiterpene by means of bromine or hydrochloric acid gas, and to isolate definite products of oxidation by treating with permanganate failed, the latter experiment only yielding resinous bodies of aromatic odor. The terpene appeared to be sensitive to light to this extent that, after having been kept for 18 months in a stoppered glass bottle the rotation had fallen to +101.2°, the other constants being almost unchanged.—Schimmel's Semi-An. Rep., October, 1909, 136; from Phillipine Journ. Sc. 4 (909), A, 121.

MELIACEÆ.

Chloroxylon Swietenia, D. C.—*Presence of an Irritant Alkaloid*.—A specimen of East Indian satin wood, which is believed to be derived from *Chloroxylon swietenia*, D. C., has been the subject of investigation by E. M. Holmes on account of the irritant effect on being sawed, producing acute dermatitis, whereas this wood ordinarily does not produce inconvenience to the workmen. A microscopic comparison of this particular sample with East Indian satin wood known to be of non-irritant character, revealed no distinctions, nor could Mr. Holmes find any distinctive character that would indicate a different species on comparison of herbarium specimens of *Chloroxylon swietenia* grown at Hanbantota, known to produce the local irritation mentioned, and specimens of the plant in the museum. Further light is, however, thrown upon the subject by the chemical experiments of Dr. S. J. M. Auld, of the Imperial Institute, who finds that satin wood contains an alkaloid, which, on further investigation by Dr. T. Cash, is found to possess the same property as the wood in causing dermatitis in certain individuals. The alkaloid is a weak monoacidic base, several of the salts of which have been prepared and characterized. It melts at 182° to 183° C., is lævorotatory, and has been named "chlor-

oxylonine." It would appear, therefore, that the fact that some specimens of the wood like that of Hanbantota are more active than others, is probably on account of possessing a larger percentage of chloroxylonine.—Pharm. Journ. and Pharmacist, Aug. 28, 1909, 295.

SAPINDACEÆ.

Kangalugi Root—A Native Remedy for African Tick.—H. Whippell Gadd says that "kangalugi root," identified by E. M. Holmes to be derived from *Deinbollea nyikensis*, Baker, is used as a native remedy for African tick or spirillary fever of man. The remedy is made by mixing ticks (species "Ngnfi") with the bark of the root, the whole roasted on a shovel, and the burnt material reduced to powder. To produce immunity against the frequently fatal bites of this tick, and subsequent fever, scarifications of the skin are made in different parts of the body and some of the powder is rubbed in. The root is used also in the treatment of rheumatism, elephantiasis, vomiting, and as an aphrodisiac (in men only), being taken in the form of a decoction. On shaking the powdered bark with water ample frothing occurs, and a saponin in the form of a white crystalline powder has been isolated from it. This saponin, which has been examined pharmacologically by Dr. W. E. Dixon, is extremely irritant, and sets up vomiting and diarrhoea from direct irritant action on the alimentary canal. In small doses it produces little effect, but it appears to have a digitalis-like action on the heart. It is not, however, absorbed in any but the smallest amounts when taken by the mouth. On the whole it is disappointing as a therapeutic agent, and unlikely to be of any practical value.—Pharm. Journ. and Pharmacist, Dec. 25, 1909, 795; from paper read in the Therap. Sec. of the Royal Society of Medicine.

Sapindus Emarginatus—Characters and Quantity of the Saponin in the Fruits.—At the request of Mr. E. M. Holmes, Mr. J. C. Umney has undertaken the determination of the amount and character of the saponin contained in some nuts of *Sapindus emarginatus*, Willd. (?), which had been forwarded to the Museum of the Pharm. Soc. of Great Britain for this purpose. Mr. Umney reports that these fruits yielded 54 per cent. of pericarps and 48 per cent. of seeds. The dried pericarps were mixed with half their weight of magnesia and extracted with methyl alcohol. The solution was evaporated to dryness, mixed with magnesia, and again extracted with absolute alcohol. The yield of crude saponin was 49.9 per cent. of the pericarps. It was purified by precipitating it from the alcoholic solution by ether, repeating the process several times. When freshly precipitated it was nearly white, but on exposure to air it became reddish-brown in color, and was, therefore, extremely difficult to purify. The crude saponin was a brownish substance, very soluble in water, less soluble in hot alcohol, and sparingly soluble in ether. The aqueous solution was neutral to litmus, and gave no precipitate with acids nor with neutral or

basic solutions of lead acetate, and the lead process is not, therefore, of any use in extracting it. It produced considerable frothing, even in very dilute solutions. It appears to consist entirely of neutral sapotoxins, which, according to Bourcel and Chevallier, are decidedly poisonous; for medicinal use, therefore, it is not suitable. The difficulty of preparing it in a pure state would make it an expensive product to produce on a large scale, unless duty-free alcohol were used.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 50.

FUMARIACEÆ.

Corydalis Solida—*Alkaloidal Constituents of the Tubers*.—In a preliminary communication on the results of a chemical investigation of the tubers of *Corydalis solida*, G. Heyl states that he has so far isolated the following alkaloids from these tubers: Protopine (m. p. 207°): a base melting at 145° C.; and a base melting at 132°–133° C., but that the investigation of the two new bases is incomplete because of insufficient material. The protopine is contained in abundant quantity in the tubers, and was easily obtained in a pure condition, being readily separated from the associated bases by its sparing solubility in ether, and by its subsequent purification as hydrochloride. By recrystallization from very dilute chloroform alcohol solution, the protopine was obtained in the form of characteristic, shining transparent crystals, the identity of which was established by its characteristic reactions as well as by the elementary analyses of its hydrochloride and platino-chloride.—Apoth. Ztg., lxxv (1910), No. 5, 36–57.

Corydalis Aurea—*Alkaloidal Constituent*.—Dr. Georg Heyl has isolated from the rhizome, stems and leaves of *Corydalis aurea* a basic substance, crystallizing in white shining scales, melting at 148°–149° C., and readily soluble in alcohol, ether and chloroform. It was obtained by extracting the drug with 80 per cent. alcohol acidulated with acetic acid, evaporating, adding ammonia to the extract and shaking out with ether. The crystalline residue of evaporation was dissolved in alcohol, the solution carefully neutralized with hydrobromic acid, the hydrobromide obtained by concentration was again decomposed with ammonia and the liberated base recrystallized from diluted alcohol. The new base dissolves without color in concentrated H₂SO₄, and at first also in concentrated HNO₃ (sp. gr. 1.3), but becoming faint yellowish-red after some time with the latter reagent. It gives no color-reaction with Erdmann's reagent; produces an olive green color, gradually changing to blue-green in the margin, with Fröhde's reagent, and gives an olive to brownish-green color with Mandelin's reagent.—Apoth. Ztg., xxv (1910), No. 17, 137.

CRUCIFERÆ.

Capsella Bursa Pastoris—*Galenical Preparations*.—Dr. P. E. Hommell

directs attention to the probable therapeutic value of the herb commonly called "shepherd's purse" (*Capsella Bursa Pastoris*), "pickpocket" and "toywort," one of the commonest of weeds, growing along roadsides, on garden soil and along the edges of farm lands and fields. Regarding its constituents, besides the ordinary constituents of herbs, it yields a volatile oil identical with oil of mustard, and also contains about 6 per cent. of a soft resin. It is believed to possess therapeutic properties that make galenical preparations, properly made, desirable, and the author has therefore experimented to determine suitable formulas. As a result he proposes fluidglycerates prepared both from the "green herb" and the "dried herb," having found the latter, much to his surprise, to yield a satisfactory preparation, so far as can be judged from the odor, taste and acidity, notwithstanding that some writers regard the dried herb as being inert. These fluidglycerates are prepared according to the type formula of George M. Beringer, using ingredients in the following proportions :

Fluidglycerate Bursa Pastoris (From Green Herb).

Bursa Pastoris (cut very fine)	1500 Gm.
Glycerin	500 Cc.
Water, to make.	1000 Cc.

Fluidglycerate Bursa Pastoris (From Dried Herb).

Bursa Pastoris (No. 40 powder)	1000 Gm.
Glycerin	500 Cc.
Water, to make.	1000 Cc.

The author also finds an alcoholic preparation to possess properties that make it satisfactory for therapeutic use, and therefore suggests

Tinctura Bursa Pastoris (From Green Herb.)

Bursa pastoris (cut fine)	500 Gm.
Diluted alcohol.....	1000 Cc.

Macerate the drug with the diluted alcohol for fourteen days, then express the liquid and filter. Dose, one to two fluidrachms, in water or syrup.—Proc. N. J. Pharm. Assoc., 1909, 48–50.

Lunaria Biennis—Alkaloidal Constituent of the Seeds.—According to Haines the seeds of *Lunaria biennis*—the so-called "garden honesty"—contains an orange-red crystalline alkaloid, or possibly a mixture of bases. After extracting the fixed oil, which is present to the amount of 30 per cent., with petroleum ether, the powdered seeds are extracted with boiling alcohol, the alcohol is recovered by distillation, and the residue taken up with aqueous tartaric acid solution. The acid solution is shaken out with chloroform, then rendered alkaline with sodium carbonate, and the alkaline solution shaken out by the same solvent, which yields the base or mixture of bases on evaporation. These are then purified by suc-

cessive crystallization from alcohol and ether.—Pharm. Journ. and Pharmacist, May 21, 1910, 646; from Rép. de Pharm., 22 (1910), 172.

CUCURBITACEÆ.

Colocynth.—*Constituents of the Pulp and Seeds*.—After reviewing the literature concerning the constituents of colocynth pulp, F. B. Power and C. W. Moore describe in detail the results of their examination, undertaken with the object of throwing further light upon the subject, employing for this purpose 105 kilograms of Turkish colocynth. Incidentally it may be remarked that the seeds, when separated as completely as possible from the pulp, were found to represent 75.5 per cent. of the weight of the entire peeled fruit. The results of the present investigation have established the fact that the so-called "colocynthin," "colocynthitin" and other products heretofore obtained from colocynth to which specific names have been attached were not pure substances, but very indefinite mixtures, and that the amount of glucoside substance present is extremely small. On the other hand it has been shown that the activity of colocynth is due to at least two principles, one of which is alkaloidal, although a very weak base, whilst the other source of activity is represented by some non-basic principle or principles contained in the ether and chloroform extracts of the resin, but which did not permit of being more definitely characterized. The colocynth contains, furthermore, a quantity of elaterin, but no evidence could be obtained of the presence of β -elaterin, which is the physiologically active constituent of the fruit of *Ecballium elaterium* (which see).

Colocynth Seeds were found to contain traces of an alkaloidal principle, which was probably identical with that contained in the pulp, an enzyme which is capable of hydrolyzing β -glucosides, and, when extracted with light petroleum, they yielded 12.72 per cent. of their weight of fatty oil. This oil is a pale yellow liquid, and its constants as well as those of the total fatty acids were determined. Its composition is evidently very similar to that of the fatty oils of other cucurbitaceous seeds, such as the melon and the pumpkin. From the unsaponifiable portion of the oil a small amount of a phytosterol, $C_{27}H_{44}O$, was isolated. This melts at $158-160^{\circ}C.$, and has $[\alpha]_D + 8.1^{\circ}$.—Chem. & Drugg., Jan. 29, 1910, 150; from Publications of the Wellcome Chemical Research Laboratories (Jan. 20, 1910).

Colocynth.—*Microscopical Examination of the Powder*.—William Mansfield contributes a paper on the microscopic examination of powdered colocynth in which he describes the characteristic elements that serve for the recognition of the genuine drug, as also those of the rind and seeds, which should not be included in the powder. The paper is illustrated by cuts showing the microscopic elements of the rind, the seed, and the pulp respectively.—Drugg. Circ., Feb., 1910, 56-58.

Ecballium Elaterium.—*Chemical Examination of the Fresh Fruits*.—

Dr. F. B. Power and C. W. Moore communicate the results of their examination of 27 kilos. of the fresh, nearly ripe, fruit of *Ecballium elaterium*. From the alcoholic extract of this they obtained a resin, the constituents of which were a small amount of hydrocarbon (m. p. 68° C.); a phytosterol, $C_{27}H_{46}O$ (m. p. 148° D.; $[\alpha]_D + 3.2^{\circ}$); a substance (m. p. 258° – 260° C.) related to ipuranol, $C_{23}H_{38}O_2(OH)_2$; fatty acids and a product corresponding to so-called "elaterin." They confirmed Berg's observation that the fruit contains an enzyme capable of hydrolyzing beta-glucosides, but, contrary to Berg's statement, they found that elaterin exists in the fruit in a free state, and not as a glucoside (see Proceedings, 1909, 392). They propose to designate the laevorotatory constituent of crude elaterin as alpha-elaterin and the dextrorotatory as beta-elaterin. The latter is the physiologically active constituent.—Chem. & Drugg. Dec. 4, 1909, 862; from Proceedings Chem. Soc., 1909.

Watermelon Seed—Chemical Examination.—F. B. Power and A. H. Salway find that the chemical and physiological examination of watermelon seeds fails to indicate the presence of any definite active principle, although the seeds are popularly reputed to be diuretic. The kernels yielded to pressure 7.4 per cent. of fixed oil, and 19 per cent. to extraction with petroleum ether. The oil agreed very closely in composition with that obtained from pumpkin seed. The press cake yielded more oil, soluble proteids, sugar, and resin. From the last, a new alcohol, cucurbitol, $C_{44}H_{86}O_4$, melting at 260° C., was isolated. This is closely allied to grindelol, $C_{28}H_{58}O_4$, and ipurganol, $C_{21}H_{44}O_4$. These evidently belong to a homologous series, $C_nH_{2n-8}O_4$. The shells contained similar constituents, and the ash showed the presence of a distinct trace of copper.—Journ. Amer. Chem. Soc., 32 (1910), 360.

MYRTACEÆ.

Cloves—Direct Estimation of Volatile Oil and Eugenol.—R. Reich has worked out a method for the direct estimation of volatile oil and eugenol in cloves. In an apparatus, described in detail, the powdered cloves, mixed with pumice and enclosed in a cartridge surrounded by a steam jacket, are exposed to a current of steam and distilled to exhaustion. From $1\frac{1}{2}$ to 2 hours are required to complete the exhaustion of 10 Gm. of cloves, and from 600 to 800 Cc. of distillate must be collected. The distillate is then saturated with common salt and extracted with successive portions of from 25 to 30 Cc. of rhigolene (pentane), which has the advantage of not absorbing water. The solvent is then evaporated and the residual oil weighed—the entire operation being accomplished in from 6 to 8 hours. To determine the eugenol, from 1.0 to 1.5 Gm. of the oil are saponified for a quarter of an hour with 20 Cc. of a 5 per cent. soda solution in a condensing tube in a water-bath, with frequent shaking. After cooling the mixture, 20 Cc. of petroleum-ether with low boiling-point are

added and the whole well shaken. The clear petroleum-ether solution is removed, the residual eugenol-sodium solution adjusted to 30 Cc. by the addition of more 5 per cent. soda solution, and of this completely bright solution, 15 Cc. are now introduced into a shaking-cylinder, 5 Cc. of 5 per cent. sulphuric acid, 6 Gm. of common salt and 20 Cc. of pentane, are added, and the mixture is shaken continuously until it separates into two perfectly clear layers. An aliquot part of the pentane solution is then pipetted into a Mann weighing flask, and when the solvent is evaporated the residual eugenol is weighed. The author mentions the method of extraction and estimation of the oil as applicable to other volatile oils, but that not all of them are miscible with pentane (rhigolene) in any proportion, and that, therefore, the amount of solvent to be used must be determined in each case.—Schimmel's Rep., April, 1910, 43; from Ztschr. Unters. d. Nahr.-u. Genussm., 18 (1909), 401.

Eucalyptus Leaves—Industrial Use in Tasmania.—H. D. Baker calls attention to a new use of eucalyptus leaves in Tasmania. While eucalyptus oil is distilled in Australia for medicinal purposes, and in New South Wales acetic acid is gained as a bye-product in this industry, but at Port Esperance the oil is obtained as a bye-product in the preparation of a more valuable extract. This extract is used as a preservative for boilers. It is miscible with water and frees the boiler from any acid and from fatty bodies and salts by forming an innocuous precipitate with these destructive ingredients and preventing incrustation. Four tons of eucalyptus leaves give one ton of extract and 70 to 80 lbs. of eucalyptus oil. Eucalyptus leaves are also recommended for use in gas manufacture. It is said that the bark can be employed in paper and tannin manufacture, as well as for leather-dressing, and the wood is very suitable for railway sleepers.—Schimmel's Semi-An. Rep., Octob., 1909, 67; from Consular and Trade Reports, No. 3415, 1909, 13.

Melaleuca Leucodendron var. *Lancifolia*—*Source of Cajuput Oil in Queensland.*—R. C. Cowley, principal of Brisbane College of Pharmacy calls attention to *Melaleuca leucodendron*, var. *lancifolia* as the probable source of cajuput oil in the Brisbane district of Queensland. It is a very common tree in the coastal districts of Queensland, growing in damp places alongside creek and water-holes. The name "Leucodendron" refers to the white scaly cork covering the plant, which is locally known as the "Ti-tree." It has a thick bark which is constantly exploiting thin papery layers of cork of a white color. This exfoliation of cork is characteristic of many Australian plants which are, like the ti-tree, provided with phyllodes in place of true leaves. These plants respire largely through the stem, and adopt this plan of keeping their lenticels open. According to Bailey, there are at least seven varieties of this tree growing in Queensland, but that growing in the Brisbane district is the one above

referred to. The yield of oil from this *lanceifolia* variety is very small. A small quantity distilled by Mr. T. Ingham from this variety was quite colorless and had a pronounced cajuput flavor. Copper stills are not employed to distill cajuput oil, to avoid obtaining a blue-colored product. Mr. Ingham has determined the following chemical and physical constants: Sp. gr., 0.922; opt. rot. (100 mm.) -3° ; refract. index, 1.4623; cineol content, 45 per cent. According to Bailey ("Queensland Flora") the cajuput oil is also obtained in the East Indies from a form of *M. Leucodendron*.—Chem. & Drugg., May 28, 1910, 62.

Japanese Pomegranate Barks.—*Alkaloidal Content.*—Hirano has determined the alkaloidal content of the root-, stem-, and branch-bark of the Japanese pomegranate, following the method of the Japanese Pharmacopœia. He found 0.32 per cent. in the root-bark, 0.12 per cent. in the stem-bark, and 0.1 per cent. in the bark from the branches. The author, furthermore, determined the presence of "mannite" in the ligneous parts of the plant.—Pharm. Ztg., liv (1909), No. 55, 538; from Journ. d. Pharm. Ges. v. Japan, May, 1909.

TAMARISCINÆ.

Tamarisk Manna—Properties.—Dr. Hooper observes that, according to the researches of Ehrenberg and Hemprich, the *gavan* of Persia is *Tamarix gallica*, var. *Mannifera*, Ehrenb., and the aphid, which feeds upon it and produces the *gez* or manna, is the *Coccus manniparus* of Ehrenberg. As recent writers speak of the tamarisk manna as an exudation or secretion of the plant, the question of its production by insect agency must be left for further investigation. Since there are several kinds of manna, it is possible that some are produced by insects, and others, as the ash manna of Sicily, occur as saccharine exudations. Two samples of tamarisk manna have been received in the Indian Museum and examined. The first was a specimen of *tirmi* from Seistan, and the second was called *maki* or tamarisk manna from Dera Ghazi Khan. The *tirmi* was a soft, gummy, deliquescent substance mixed with a few small leaves. Alcohol separated a large quantity of sugar, reducing Fehling's solution and readily fermenting with yeast. The portion insoluble in alcohol was in white crystals and soluble in half its own weight of water. It melted at 140° C.: the solution was dextro-rotatory, and boiling with diluted acid caused inversion. The sample of *maki* from Dera Ghazi Khan was much darker in color, and white transparent crystals had separated out which were identified as those of cane sugar. The chief sugar of tamarisk manna is, therefore, not mannite, but a saccharose or cane sugar, as has been indicated by previous investigators. The samples contained only traces of nitrogen, estimated by Kjeldahl's process, proving that the exudation, as a food substance, is composed entirely of carbohydrates.—Pharm. Journ. and Pharmacist, Oct. 2, 1909, 423; from Journ. Asiat. Society of Bengal, New Series, v, No. 2, 1909.

ROSACEÆ.

Prunus Virginiana.—*Confusion with, and adulteration of, Prunus Serotina* Bark.—John Moser, Jr., observes that, while it is generally believed that wild cherry bark is seldom or never adulterated, it appears that collectors frequently mistake *Prunus virginiana*, L. or "choke-cherry," for *Prunus serotina*, Ehrh., or "wild black cherry," which is the official source of wild cherry bark. This is a large tree, whilst *Prunus virginiana* is a tall shrub, bearing a red fruit having a very astringent taste. Both grow abundantly throughout the eastern and central United States, and the author's description of "choke-cherry" bark is therefore very opportune. It occurs in strips of various length, 1 to 4 Cm. wide and 0.5 to 2 Mm. thick; outer surface brownish green, with numerous large tentacles, 0.5 to 1.5 Cm. long; inner surface reddish brown, finely striate; fraction fibrous: inner color white; odor of bitter almond when moistened; taste bitter and astringent. The cross section shows numerous bast fibres, parenchyma containing spherical starch grains 2 to 3μ in diameter, tannin masses which are colored brownish by ferric chloride, and calcium oxalate in rosette aggregates of crystals 20 to 30μ in diameter. The powder is lighter in color than that from wild cherry bark and is distinguished by its numerous bast fibers which are 1.5 to 2.5 Mm. long, 12 to 20μ in diameter, lignified, and have a thin lumen.—*Amer. Journ. Pharm.*, Dec., 1909, 579.

Wild Cherry Bark.—*Isolation and Characters of Glucosides*.—As is well known, wild cherry bark (*Prunus serotina*, Ehrh., *P. virginiana*, Mill.), when stirred with water, yields an essential oil consisting chiefly of benzaldehyde and prussic acid. Although the constitution of the benzaldehyde points to the presence of a glucoside, attempts to isolate such a compound have not been successful. The fact, however, that Hérissé obtained from a closely allied species, *Prunus padus*, L., amygdono-nitrile glucoside (see "Proceedings," 1908, 407), made it probable that the same combination existed in *Prunus serotina*, and F. B. Power and C. W. Moore have now succeeded in proving that is, in fact, the case. These investigators have published the results of an examination of the constituents of bark of *Prunus serotina*, in which they state that in that portion of the alcoholic extract of the bark which is soluble in water, they have discovered the presence of 1-amygdono-nitrile glucoside (m. p. 145° to 147° C. from acetic ester, $[\alpha]_D -29.6^{\circ}$ C.), although this body, it is true, only occurs in very small proportions. They also obtained tetra-acetyl-amygdono-nitrile glucoside, which, recrystallized from alcohol, melted at 136° to 137° C.; $[\alpha]_D -24.0^{\circ}$ C. (in acetic ester). From the alcoholic extract they isolated by steam distillation, in addition to a small portion of benzoic acid, an essential oil, but in such a minute quantity that it was only possible to determine the b. p. (100° to 120° C. at 5 Mm. press.). This oil had a pleasant

aromatic odor, which was, however, altogether different from that of benzaldehyde. The bark yielded 0.075 per cent. of hydrocyanic acid, and contained a whole series of other substances, among them : (1) a *phytosterol*, $C_{27}H_{46}O$; (2) *oleic*, *linoleic*, *isolinoleic*, *palmitic* and *stearic acids* ; (3) a small quantity of *isopuranol*, $C_{22}H_{40}O_4$, crystallizing from a mixture of pyridine and alcohol in needles melting at 285° – 290° C. ; (4) *Trimethylgallic acid*, $C_7H_3O_2(OCH_3)_3$, m. p. 167° – 169° C. ; (5) *p-coumaric acid*.—Schimmel's Semi-An. Rep., Oct., 1909, 127, and Rep. of Roure-Bertrand Fils., Oct., 1909, 142 ; from Journ. Chem. Soc., 95 (1909), 243.

Wild Cherry Bark—Constituents.—In his paper on wild cherry bark, published many years ago, the late Professor Wm. Procter, Jr., demonstrated the formation of volatile oil and hydrocyanic acid under conditions which pointed out conclusively that their formation was due to an amygdalin-like glucoside and an emulsin-like albuminoid ; also, that the bitterness was probably due to a glucosidal principle distinct from amygdalin. None of these were however obtained in an isolated condition. Henry Weimar now records experiments in order to throw further light upon the subject. His endeavor to isolate amygdalin in a crystalline condition failed of success ; but he obtained an amorphous body (amorphous amygdalin) which gave all the reactions commonly attributed to amygdalin. In addition to this a fluorescent bitter substance, resembling but probably not identical with æsculin. He expresses the opinion that the bitterness of the bark is due to these two principles.—Proc. Arkansas Pharm. Assoc., 1909, 67–71.

Quillaia Bark—Spurious Varieties.—In the "Museum Report" for 1907, Mr. E. M. Holmes had drawn attention to a spurious quillaia bark, which differed from the genuine in being thinner, more brittle, and in having the surface covered with a thin brownish layer, marked with a coarse network of whitish lines. Since then he had received specimens of another quillaia bark in quilled pieces, with the genuine, which on analysis by Messrs. Wright, Layman and Umney was found to contain a larger quantity of saponin than even the genuine bark. The quilled pieces were from 3 to 6 inches long, about $\frac{1}{8}$ inch thick, and $\frac{1}{2}$ inch wide. The fracture does not show the characteristic laminæ of *Q. saponaria*, and the substance of the bark is softer. At his request, Mr. Bertram Cockburn has made a histological examination of the three barks, referring to the false bark of 1907 provisionally as *Quillaia pæppigii* and to the quilled bark as *Quillaia smegmadermos*, this being the only other species of the genus recorded from Chili, whence these barks are supposedly derived. Mr. Cockburn reports his results in some detail, from which the following recapitulation of the distinguishing characters of the three barks is taken :

Official Quillaia Bark.—Strands of bast fibers placed axially. Bast fibers, *not* usually extending from one ray to another. Medullary rays of

usually four rows of cells. Lignification confined to the lateral cells of the medullary rays. Starch grains few, 4μ to 6μ in diameter.

False Quillaia Bark.—Strands of bast fibers placed obliquely. Bast fibers usually extending from one medullary ray to another. Isolated fibers not numerous. Medullary rays usually of three rows of cells. Lignification continued, as a rule to the third cell of the ray.

Quilled Quillaia Bark.—Strands of bast fibers smaller, rarely exceeding fifteen to twenty fibers. Isolated fibers of more frequent occurrences. Starch abundant and larger, 5μ to 15μ in diameter. Medullary rays usually of four rows of cells. Large irregular sclerotic cells in the cortex. Sclerotized cells almost absent in medullary rays.

Mr. Cockburn concluded from these results that the powder should be diagnosed by the amount of saponin present, and under the microscope, by the size of the starch grains, the relative abundance of sclerotized cells of the medullary rays, and of the irregular bast fibres, and in the case of the false quillaia bark, *Q. Pappigii* (?), by the more pronounced reddish tint.—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 79.

Soap Barks—New Varieties.—"Micron" calls attention to the gradual disappearance of *Quillaia saponaria* bark from the market, and its replacement by a thinner, harder and darker-colored bark, which is said to be less rich in active chemical constituents than the genuine soap bark. From the closely similar laminated structure, crystalline deposits, and peculiar physical properties, it is inferred that the new bark is derived from a related species of *Quillaia*. Mr. Holmes suggests that the former source, *Quillaia saponaria*, having become exhausted, the bark of one or the other indigenous species is being substituted, and that the one under consideration is probably derived from *Q. Poppigii*. Another soap bark, less commonly met with, occurs in small quills or curved pieces about the size of those of canella or cusparia. Obviously this is a much younger bark and may be obtained from the branches of the official *quillaia*, or from *Q. Poppigii*, or possibly from a third species, *Q. Segmadermos*. The microscopic distinction of the two inferior barks are shown in cuts illustrating the author's paper.—Chem. and Drugg., Sept. 11, 1909, 443.

LEGUMINOSÆ.

Bolivian Copaiba—Source and Properties.—C. Hartwich describes a new copaiba of Bolivian origin, which is derived from a new species of *Copaiba* discovered by Herzog in Bolivia and described by him as *Copaiba paupera*, nov. spec. This is a tree about 30 meters high, which occurs sporadically in the forests of the province of Velazco, on the Rio Blanco. The copaiba is described by Hartwich as being of a light brownish yellow color, and of a viscous consistence, resembling the known varieties (particularly Maracaibo) both in odor and taste. It also resembles the latter

in its other properties, but in its optical behavior it offers marked differences, being in this respect more nearly related to African copaiba (see Proceedings 1909, 213), being like that dextrogyre, whereas all other copaibas are laevogyre. By steam distillation the copaiba yielded about 23 per cent. of volatile oil which gave the following constants: d_{15}^{20} 0.916, n_D^{20} 1.48°, n_D^{25} 1.5048, acid no. 1.07, sap. no. (cold) 1.60. It is soluble in 9 vols. of 95 per cent. alcohol, as well as in ether, chloroform and petroleum ether. Liebermann's test gives at first a blue and then a green coloration; Flückiger's test a scarcely perceptible dirty color. When the oil was fractionated under ordinary pressure, about 70 per cent. passed over between 250° and 270° C. and about 10 per cent. over 270° C. Hartwich concludes from the constants that the principal fraction contains caryophyllene and cadinene, but he does not mention any experiments for identifying these bodies.—Schimmel's Semi-An. Rep., October 1909, 135; from Schweiz. Wschr. f. Chem. u. Pharm., 47 (1909), 373.

Myrocarpus Balsam—A Relic of Medieval Medicine.—E. Schaer has examined a specimen of "myrocarpus balsam," an obsolete balsam of medieval pharmacopœias, which had been handed down in a family. A comparison of the properties of this sample with the statements of ancient writers on natural history confirms his surmise that the article is identical with *Cabureiba* balsam, which was described by the Dutch physician, Willem Piso, about the middle of the seventeenth century, in his "*Historia naturalis Brasiliae*," IV, 5, 57, and also with that called "*Baume du Pérou en coques*," by Gibourt, in his "*Histoire naturelle des drogues simples*." From the two species *M. fastigiatus*, Allem., and *M. frondosus*, Allem., of the *Myrocarpus* family, which are natives of Central Brazil, there exudes, either naturally or as the result of incision, a balsam which is caught up in the hollowed-out, walnut-sized fruits of certain palms or myrtaceæ. After the contents have been left to dry for several days, the receptacle is closed with vegetable wax. The balsam itself is reddish-brown, and apart from its viscous consistency it showed great similarity to Peru and tolu balsam in its appearance and odor, as well as in its other properties. Among its constituents Schaer found both free benzoic acid and benzoic acid in combination with aromatic alcohols. On the other hand, neither cinnamic acid nor vanillin could be definitely determined as such. In this connection Schimmel & Co. observe that a sample of balsam which was sent to them a long time ago may also be a myrocarpus balsam, as all the details given by Schaer agree precisely with our sample, which was moreover also contained in a fruit the size of a walnut, and sealed with wax.—Schimmel's Semi-An. Rep., October, 1909, 138; from Arch. d. Pharm., 247 (1909), 176.

Caragana Arborescens—A New Glucoside in the Leaves.—The leaves of *Caragana arborescens*, Lamark, a native of the Ural Mountains, but long

cultivated in parks and gardens, are now found by E. Reeb to contain a bitter glucoside, which he has named *Caraganin*. It forms yellow scales or a yellow powder, and is hydrolyzed by acids with formation of glucose. Caraganin appears to be inert on the frog's heart. The glucoside was isolated from the dry alcoholic extract of the leaves, which was dissolved in a little water, and salted out with sodium sulphate to saturation. The precipitate containing the glucoside was extracted with alcohol, filtered, evaporated to dryness, and again redissolved in water. The salting out with sodium sulphate was again repeated. After three or four such treatments the glucoside is separated fairly pure. It was then further purified by treatment with lead acetate and filtered, and the excess of lead removed with hydrogen sulphide. Caraganin was then obtained by evaporation.—Pharm. Zentralh., 50 (1909), No. 35, 738; from Journ. d. Pharm. v. Els.-Lothring., 1909, 86.

Cicer Arietinum.—*Carbohydrates of the Seeds*.—According to N. Castoro the seeds of *Cicer arietinum* contain saccharose, glucose, levulose and a new polysaccharide, *γ-galactane*, isolated from the extract obtained with alcohol, 70 per cent., by precipitation with absolute alcohol. It forms a white flocculent precipitate, and does not reduce Fehling's reagent until hydrolyzed with dilute mineral acids. It forms a glucosazone with phenylhydrazine, and gives the levulose reaction with hydrochloric acid and resorcinol. When oxidized with nitric acid it yields about 37 per cent. of mucic acid. Its $\alpha_D = +134.2^\circ \text{C.}$ to $+144.66^\circ \text{C.}$ In addition to these sugars the seeds contain the hemicelluloses, para galacto-arabane and levulosane.—Pharm. Journ. and Pharmacist, Oct. 16, 1909, 474; from Gazz. Chim. Ital., 1909, 608, through Journ. de Pharm. et Chim., 30 (1909), 308.

Erythrina Zeyheri, Harv.—*Botanical Description*.—*Constituents of the Seeds*.—Having received a herbarium specimen and photograph of a flowering twig of *Erythrina zeyheri*, Harv., a plant indigenous of the Orange River Colony, E. M. Holmes briefly communicates some of the botanical details and the results of a chemical examination of the seeds given by Mr. E. Langham, of Vrede, O. R. C. It is a prickly herb having an average height of 18 inches, the prickles being situated on the ribs of the stems and on the veins of the leaves, but are most abundant near the base of the stem. The trifoliate leaves, 3 to 6 inches long, have the lateral, oval leaflets smaller than the terminal subrotund one. The legumes are acrid to the taste, and contain poisonous principles, but lose these properties when boiled, and can be eaten like "legumes verts." The seeds have a scarlet testa, but do not give up their color to chloroform. They are used by the Kaffirs in South Africa for making necklaces. The average weight of the seeds is 20 grains. An analysis of the seeds was made, and they yielded 28 per cent. of a bland nutty flavored fixed oil, and 4 per

cent. of a volatile oil (erythrol), having a pungent odor recalling that of horseradish. The *volatile oil* is a powerful irritant. The mixture of the two oils in the natural proportions 28×4 speedily causes a pricking sensation when applied to the tongue. The volatile oil is soluble in alcohol and ether and distills at 60° C. It appears to belong to the butyl series of alcohols. The seeds also yield an *alkaloid*, which is insoluble in ether or benzol, for which the name "erythrine" is proposed. The *fixed oil* is aperient, but must be free from volatile oil, which is irritant and may prove useful for liniments.—Pharm. Journ. and Pharmacist, Jan. 8, 1910, 25.

Licorice Root—Collection in Bokhara.—A writer in "Pharmaceutische Zeitung" (liv, No. 87, 859) gives some interesting information concerning the distribution and collection of licorice root in Bokhara. The plant abounds on both sides of the Amu river and is particularly abundant in the neighborhood of Tschardshui, which is the center of the collection of the drug—the final drying of the roots and pressing into bales being conducted on a large scale in a plant erected and maintained by an English firm. The prices paid to the collectors living in the town and surrounding villages is ridiculously small (10 copecs per pud = 21.6 pounds). It is baled by hydraulic pressure into bales of 9–12 puds for export, mainly to Great Britain and the U. S.—the export in 1909 amounting to 9000 tons.

Sicilian and Russian (Uralsk) Licorice Root—Commercial Form and Botanical Source.—E. M. Holmes states that *Sicilian licorice root* arrives in English commerce in the peeled form and cut up into short lengths of about $\frac{3}{4}$ inch, and gives the following information, supplied by Mr. Arthur Barrett, of Messina, concerning its preparation for the market: He states that the rhizomatous portion is preferred to the root, since it occurs in straighter lengths, and is, therefore, easier to peel. This operation is performed by women, and is by no means an easy one, even a practiced operator not being able to peel more than 20 pounds per day, and generally less. The waste and peel (and also the root) is used for making licorice paste. Sun drying is preferable to kiln drying, producing a lighter color. Regarding *Russian licorice root*, Mr. Holmes observes that a new species of licorice plant has recently been mentioned under the name of *Glycyrrhiza uralensis*, as yielding the licorice root of the Uralsk district in Russia, which differs in its bitterness and deeper yellow color internally, and reddish scaly surface, from that of western Europe, from *G. glabra*. Specimens of roots, fruiting stems and separate fruits of the Uralsk plant, examined by Mr. Holmes, prove these to be those of *G. glandulifera*, Waldst. and Kit.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 52.

Paranuts—Peculiar Change.—Having occasion to examine paranuts under the microscope, Dr. Hugo Kuhl observed that the kernel of one of the nuts, which have a shining fatty appearance and milky color, had

acquired a completely crystalline appearance, resembling coarse-grained gypsum, and a bluish-white color. On nearer examination the presence of fungus tubes between the crystals became evident, and cultures obtained from it on sterilized honey solution proved this fungus to be *Aspergillus flavus* which, as well known, has poisonous properties.—Pharm. Zentralh., 51 (1910), No. 6, 106.

Red Clover Flowers—Constituents.—Frederick B. Power and Arthur H. Salway have made a complete chemical examination of the flowers of the common red clover—*Trifolium pratense*, L.—using for this purpose material collected during the month of June, each blossom having been separately gathered in order to exclude the green, herbaceous parts of the plant. The weight of the material, when fresh, was 264 kilos., and after careful drying amounted to 53.4 kilos. The dried flowers were completely extracted with hot alcohol, and, after the removal of the greater portion of the alcohol, the resulting extract was distilled with steam. A small amount of an essential oil was thus obtained, which possessed a rather unpleasant odor, and was found to contain furfuraldehyde. The portion of the alcoholic extract which was soluble in water contained a large amount of sugar, but from it a considerable number of definite crystalline substances were isolated, several of which are new compounds. These substances may be briefly enumerated as follows: Salicylic and *p*-coumaric acids; *isorhamnetin*, $C_{16}H_{15}O_7$; *pratol*, $C_{16}H_{15}O_2(OH)(OCH_3)$, which apparently is a flavone derivative; *pratensol*, $C_{17}H_{15}O_4(OH)_2$; a *yellow compound*, $C_{16}H_{15}O_7$; a *substance*, $C_{16}H_{17}O_3(OH)_2$; a *substance*, $C_{14}H_{12}O_8$; and the new glucosides; *trifolin* $C_{22}H_{22}O_{11} \cdot H_2O$, which yields on hydrolysis a yellow coloring-matter, *trifolitins*, $C_{16}H_{10}O_6$, and rhamnose; *iso-trifolin*, $C_{22}H_{22}O_{11}$; and a glucoside which, on hydrolysis, yields quercetin $C_{15}H_{10}O_7$.

The portion of the alcoholic extract which was insoluble in water consisted chiefly of resinous material, but from it the following definite compounds were obtained: myricyl alcohol, $C_{31}H_{63}OH$; heptacosane, $C_{28}H_{56}$, and hentriacontane, $C_{31}H_{64}$; sitosterol, $C_{27}H_{46}O$ (m. p. 135° – 136° C.; $[\alpha]_D^{25}$ — 34.4° C.); a new dihydric alcohol, *trifolianol*, $C_{21}H_{34}O_2(OH)_2$; a mixture of fatty acids (consisting chiefly of palmitic, stearic, and linolic acids); and a small amount of pratol, $C_{16}H_{15}O_4$, the last-mentioned having evidently been contained in the resin in the form of a glucoside. The dihydric alcohol, trifolianol, $C_{21}H_{34}O_2(OH)_2$, is homologous with ipuranol, $C_{23}H_{38}O_2(OH)_2$, and with the recently discovered citrullol, $C_{22}H_{36}O_2(OH)_2$ (from colocynth), the three compounds being apparently consecutive members of a series which is represented by the general formula $C_nH_{2n-6}O_4$. In connection with the isolation of the above-mentioned substances from red-clover flowers it is of interest to note that at least three of these—namely, myricyl alcohol, and the hydrocarbons heptacosane and hentriacontane—are also constituents of beeswax, the chief component of

the latter being myricyl palmitate.—Chem. & Drugg., Febr. 12, 1910, 273; from Contribution of the Wellcome Chemical Research Laboratories.

Tephrosia Macropoda—*A Powerful South African Poison Plant*.—E. M. Holmes has examined the root, and some leaves of a plant were sent to the Museum a few years ago for identification by Mr. J. Newson, of Pietermaritzburg, in Natal. The leaves presented the characteristic appearance and silky surface of the leaves of several species of this genus, and the roots the fibrous character usually present. On comparison at Kew it proved to be the above-named species. Mr. Newson says that the native name is I'tyosaan (Kaffir). The point of interest about it is that a man who took an infusion of it in mistake for a root which causes vomiting, and is used by the Kaffirs when they feel queer, in two or three minutes after drinking the infusion fell down apparently dead. An English medical man who happened to be on the spot said that it was one of the quickest poisons to act that he had ever seen. He at once examined the native, who was a big, strong man, and who appeared to be dying, but after about ten minutes' artificial respiration the patient gave a big gasp, and in a few minutes got up and only complained of a very bad headache. It occurred to Mr. Holmes, in reading this letter, that the effects might have been due to *cytisine*, which Professor Plugge had found in several leguminous plants, and he sent the root to him for examination. Prof. Plugge replied that it did not yield cytisine, but that it contained a non-alkaloidal active principle which possessed the properties of a heart poison. The plant is evidently worth further investigation, which will, Mr. Holmes believes, be undertaken by Mr. L. Lake, of Verulam, Natal.—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 50.

Tolu—*Satisfactory Test*.—According to Fleissig the various official methods for determining the free acid and saponification value of balsam of tolu are not so satisfactory as the following tests originally suggested by Merck: 1 Gm. of the balsam is dissolved in 50 Cc. of alcohol, and treated with 6 Cc. of $\frac{N}{2}$ KOH solution; a little phenolphthalein solution is added, and then 200–300 Cc. of water. The solution should be distinctly red, or become so on adding 1 drop of the standard alkali. The excess of alkali may then be determined by titrating back with $\frac{N}{2}$ HCl. To determine the saponification value, 1 Gm. of the balsam and 20 Cc. of $\frac{N}{2}$ KOH are heated together on the water-bath for thirty minutes, then diluted with 200 to 300 Cc. of water, treated with 10 drops of phenolphthalein, and titrated back with $\frac{N}{2}$ HCl. From 13.2 to 14.5 Cc. of the latter should be necessary.—Pharm. Journ. and Pharmacist, May 14, 1910, 609; from Schweiz. Wschr. f. Chem. u. Pharm., 47 (1909), 365.

TEREBINTHACEÆ.

Manila Elemi.—Source, Collection, etc., in the Philippines.—Regarding the question of the botanical source of Manila elemi, viz., *Canarium lugonicum* (Miq.), A. Gray, as being definitely settled (see "Proceedings," 1908, 243), Bacon declares that Manila elemi in the fresh state, as taken from the tree, is always soft, and only becomes hard after prolonged exposure to air and sunlight. This is in contradiction of the view of Tschirch, who distinguishes three varieties of Manila elemi, viz., hard, soft, and Tacamahac elemi. After giving some details as to the manner in which the Chinese conduct the trade in elemi, Bacon turns to the mode of collecting the gum. He states that it flows in the trunk of the tree chiefly when the tree is beginning to develop new leaves, and that in the principal place of production, viz., Atimonan, in the district of Tayabas, this takes place about January and June. During the rest of the year the tree is shedding its leaves and yields no resin. For the purpose of collecting the balsam the natives make incisions in the tree with tools known as *bolos*. The resin then exudes from the cuts and collects on the bark, from which it is removed once every few days, before it has grown dirty or hard. Bacon concludes from his own examinations that healthy, full-grown trees are capable of yielding annually 4 or 5 kilos of gum. One large tree produced as much as 22 kilos in 2 months. The production of essential oil from the various varieties of elemi, of different origin but of the same botanical derivation, was carried out by distilling the fresh gum *in vacuo*, separating the resultant oil from the water, drying with chloride of calcium, and again distilling *in vacuo*, in which process only the terpene fraction was considered, which was again distilled by Bacon under ordinary pressure. Of 62 samples, taken from different trees at Calaog, in the district Tabayas, only two contained d-limonene: b. p. 174° to 176° C., and 175° to 176.5° C., $n_D + 89.0^{\circ}$ and $+ 96^{\circ}$ C., respectively. The other samples contained phellandrene; their boiling points varied from 168° to 179° C., and their rotation lay between $+ 134.5^{\circ}$ and -60.6° C. So far as the technical details of the collection of elemi are concerned, the author states that the best means of cleaning the crude, and often dark and dirty gum, consists in dissolving it in benzene and in freeing the filtered solution from benzene by distillation. A pale product of the same scaly structure as elemi is thus obtained. Furthermore, the residue of resin remaining in the preparation of the oil appears to be suitable for preparing lacquers and varnishes, in which direction experiments are now being made, while on dry-distillation of this residue an apparently valuable resin-oil is also obtained.—Schimmel's Semi-An. Rep., October, 1909, 54-56; from Philippine Journ. of Sc., 4 (1909), A, 93.

Rhus.—What is the Nature of the Poisonous Principle?—L. E. Warren in an exhaustive review of the successive investigations regarding the na-

ture of the active poisonous principle of the different species of *Rhus* which are reputed to possess poisonous properties, says that the specific cause of rhus poisoning long remainsd a mystery, and even at present the problem is far from being well understood, either chemically or physiologically. An emanation or vapor, a gas, a volatile alkaloid, a volatile acid, an infection by bacteria, a non-volatile oil, a glucoside, a non-volatile acid resin, and a polyhydric phenol, have each in turn been accused of being the primary cause of the infection. So far as known all the poisonous species of *Rhus* (which are mentioned by the author) contain a viscid, pale cream-colored, emulsion-like juice which begins to darken at once on exposure to air, and eventually becomes black. Some information was gained by a study of the varnish-forming properties of the juice, but this knowledge found little application in elucidating the chemistry of the poisonous principle, which previous to 1830 was believed to be a volatile emanation from the juice, which itself was not otherwise poisonous. In that year Rafinisque, although mentioning that the poison sumac gave off *carbonated hydrogen* (!), must have suspected that the juice itself was venomous, because he enumerates "toxine resin" as one of the constituents. In 1858 Khittel isolated a "volatile alkaloid" to which he attributed the poisonous activity; but this could not be found by Maish in 1865, who attributed the toxicity of *Rhus* to a new volatile acid, "toxicodendric acid," and this was long accepted as being the true active constituent. In 1894-5, however, Pfaff was led to suspect the *non-volatile* nature of the poisonous constituents of *Rhus*, and having proven the toxicodendric acid of Maisch to be simply acetic acid, demonstrated the presence of a non-volatile oily body which he named "toxicodendrol" and proved to be the poisonous constituent of both ivy and sumac, present in all parts of the plant—stems, branches, roots, leaves, and fruit. In 1903-5 Tschirch and Stevens made an exhaustive examination of Japanese lac, the milk-sap of *Rhus vernicifera*, and established the non-volatility of the poisonous constituent, while Stevens and Warren subsequently (1907) showed the milk-sap of *Rhus vernix* to be analogous in almost every particular to the valuable Japanese lac. They describe the poison constituent of *R. vernix* as being a beautiful, clear, amber-red, oily, non-volatile liquid of sp. gr. 0.9693, soluble in aniline, amyl alcohol, acetone, acetic ether, benzol, petroleum benzin (b. p. below 50° C.), chloroform, carbon disulphide, carbon tetrachloride, ethyl alcohol, methyl alcohol, ether and toluol. It is very poisonous. Still more recently several Japanese chemists (Majima, Cho, and Miyama) have investigated the poisonous constituent of Japanese lac, which they have named "urushinic acid." From the analysis of the derivatives of this acid they conclude that it exists in the juice of the plant in a phenolic condition. In the purest state in which Mr. Warren has been able to obtain this resin (or oil) it is a clear, pale amber-red, adhesive, viscous, transparent liquid, of the con-

sistency of thick syrup, and having a distinct, characteristic odor. It is a powerful escharotic. In the properties of its esters and its behavior with ferric salts, its phenolic character is indicated. It is singular that none of its known compounds are poisonous.—Pharm. Journ. and Pharmacist, Oct. 30 and Nov. 6, 1909, 531 and 562.

RHAMNACEÆ.

Cascara Sagrada—*Yellow Volatile Constituent*.—F. H. Alcock, having obtained a yellow-colored distillate on determining the alcohol in a sample of liquid extract of cascara, the distillate, which contained 10 per cent. of alcohol, was shaken out with ether, to which the yellow color was communicated, leaving the aqueous layer colorless. On evaporating the ether a small quantity (0.003 Gm. from 25 Cc. of liquid extract) of residue was obtained, apparently consisting of a greasy, yellow body having an agreeable odor, and of minute slightly colored crystals. On the addition of ammonia a crimson-colored solution was obtained, which retained its color for many hours. Mr. Alcock suggests the possible identity of this substance with the yellow volatile body discovered by Tschirch and Klaverness in Uganda aloes in 1901.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 666.

Rhamnus Carniolica—*Adulterant or Substitute for Frangula Bark*.—John Moser, Jr., says that frangula frequently has admixed with it or is wholly substituted by the bark of *Rhamnus carniolica*. Of five samples of frangula recently examined by him only one was of official quality, three were mixtures of frangula and *Rhamnus carniolica* bark, and one consisted entirely of the latter. This bark is usually thicker than frangula bark, being 1 to 3 mm. thick; the external surface is grayish or grayish-brown, usually somewhat wrinkled longitudinally, and with numerous lenticels 1 to 2 mm. long, rather obscure; the inner surface is grayish to dark brown, longitudinally striate from the bast fibers near the surface; the fracture is short-fibrous, the bast fibers frequently projecting 0.5 to 1 Cm. from the inner bark; the inner surface is reddened by alkalies as in frangula; the odor is slight, and the taste bitter and astringent. In frangula the bark is thinner, darker brown, with more numerous, prominent, and larger lenticels; the inner surface is more finely striate, there are fewer bast fibers, and the medullary rays, which in *R. carniolica* are 4 to 7 cells wide, are in frangula only 2 cells wide, while the taste of frangula is only slightly bitter.—Amer. Journ. Pharm., Dec., 1909, 580.

AQUIFOLIACEÆ.

Maté—*Improved Quality by Cultivation*.—G. Bertrand and T. Devuyt point out that improved methods in the cultivation of maté have resulted in a product which gives an infusion of very agreeable taste and aroma, and quite transparent. The following analysis of the substance is given:

Water, determined at 110° C., 10.5; matter soluble in ether, 16.57; organic matter soluble in water, 30.79; mineral matter soluble in water, 3.78; caffeine, 2.02; sugar, as glucose, 6.08; tannin, 11.22; organic matter insoluble in water, 52.73; mineral matter insoluble in water, 2.2; total nitrogen, 2.13; total ash, 5.98, all in percentage. Figures are also given for the analysis of the infusions obtained from 5 Gm. of the maté and 500 Cc. of boiling water. The first infusion was for three minutes at a temperature of about 90° C., the second on the old marc for ten minutes, and the third for one hour. The results were, respectively: Total dissolved substance, 21.8, 10.0, 2.2; organic matter, 19.4, 9.4, 2.1; mineral matter (ash), 2.4, 0.6, 0.1; tannin, 7.68, 3.4, 0.05; caffeine, 1.39, 0.31, 0.26. The most agreeable "tea" is obtained by first pouring just sufficient boiling water onto the maté to moisten it thoroughly, and then, after a few minutes, adding the remainder of the boiling water and allowing to infuse for fifteen minutes.—Pharm. Journ. and Pharmacist, June 25, 1910, 787; from Bull. des Sci. Pharmacol., May, 1910, 249.

EUPHORBIACEÆ.

Caoutchouc.—*A New Solvent*.—Emil Fischer has patented in Germany the use of symmetrical ethylene dichloride (ClHC.CHCl) as a solvent for crude caoutchouc. The new solvent gives a true solution and not a mere swelling and diffusion of the material, and has the great advantage over most of the rubber solvents known of being non-inflammable. Its solvent action is greater than that of chloroform or of carbon tetrachloride. As its boiling-point is only 55° C., it is also more volatile than other solvents, and its vapors are non-explosive.—Pharm. Ztg., liv (1909), No. 56, 552.

Euphorbia Pilulifera.—*Preliminary Examination*.—In the course of a preliminary examination of *Euphorbia pilulifera*, J. Stableford Hill determined the amount of moisture in the drug to be 8 per cent., the ash 8.2 to 8.5 per cent. The details of his further experiments revealed the presence of a small quantity of alkaloid, tannic acid, a waxy substance, and several resins, but no volatile oil. Successive extractions of the drug with different solvents gave the following figures, calculated upon the dry drug: Petroleum ether, 1.67 per cent.; ether, 1.67 per cent.; chloroform, 0.58 per cent.; acetic ether, 2.66 per cent.; absolute alcohol, 11.15 per cent.—total, 17.73 per cent. Cold 90-per cent. alcohol alone yielded 12 per cent. of extractive, of which 56.3 per cent. was soluble in water.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 325-327.

Hura Crepitans.—*Albuminoid Toxic Constituent*.—C. Richet states that the milky juice of *Hura crepitans*, the Brazilian euphorbiaceous plant, known to botanists by its curious fruit, contains an extremely poisonous substance of the nature of an albuminoid, which he has named

Crepitin. This is obtained by precipitating the juice with 95-per cent. alcohol. It is coagulated by acids and by heat. The minimum lethal dose,

by intravenous injection, for the dog, is 1 Mgm. for 100 kilos body weight. Death occurs after three days. Like abrin and ricin, it exerts its toxic action on the blood.—Pharm. Journ. and Pharmacist, May 7, 1910, 571; from Ann. Instit. Pasteur, 23, 745.

Jellas Root—*Botanical Source (Probable) and Toxicity*.—Specimens of jellas root, stated to be used, along with *Antiaris toxicaria* and *Strychnos tieule*, as an ingredient of "Ipoh," the arrow poison used in the East Indian Archipelago, have been submitted by Mr. E. M. Holmes to Dr. Gordon Sharp to determine its toxicity. He finds that the bitter, dried weak-alcoholic extract gives no characteristic reactions with sulphuric or nitric acids, nor with sulphuric acid and potassium dichromate, and the same is true of the aqueous extract. Experiments on frogs show it to be a feeble poison, this action, manifested only with very large doses, pointing in the direction of methyl-strychnine or curare. A leaf of the plant and fruit attached, received with the root, was submitted to Mr. L. Brodie, who replied that "the structure of the leaf is of a peculiar type, and is so nearly identical with that of *Eurycoma apiculatum*, A. W. Benn., that the plant, at any rate, must be quite near to the genus *Eurycoma* (N. O. Euphorbiaceæ)."—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 80.

URTICACEÆ.

African Cannabis—Inferiority to Indian Cannabis.—E. M. Holmes calls attention to the importation during the last few years of a considerable quantity of "gauza" (Indian Hemp) from East Africa, and that he is quoted on the London drug market as authority for the statement that the African cannabis was as good as the Indian drug. Quite the contrary is true, however, since four years ago (see Proceedings, 1906, 798) he had pointed out that the African drug was not nearly as effective as the Indian, and had suggested that it should not be used for making the preparations of the B. P., though it might be useful for preparing corn solvents. The African leaves give a greener tincture and extract than the Indian, but this would not be a safe guide. Moreover the African drug varies very much in character, some containing much more stalks and leaves than others. The amount of alcoholic extract from a number of commercial samples recently examined by C. E. Sage varied from 6.2 to 10.8 per cent., which is much lower than that reported to Mr. Holmes in the paper above referred to.—Pharm. Journ. and Pharmacist, July 31, 1909, 132.

Bleekrodea Tonkinensis—A New Caoutchouc Tree in Tonquin.—Durard and Eberhard report the discovery of a new source of caoutchuc in a tree indigenous to Tonquin, *Bleekrodea tonkinensis*, growing abundantly in the province of Bao-Kan and in the southern sections of the provinces of Bao-Lac and Cao-Bang. The latex of this tree contains about 7 per cent. of caoutchouc, which is not inferior to the para drug.—Pharm. Ztg., liv (1909), No. 90, 891; from L'Union pharm., 1909, No. 10.

Figs—Components.—Paladino has determined the constituents in the pulp of fresh figs, which he reports as follows: water, 80 per cent.; nitrogenous bodies, 0.7 per cent.; fats, 0.3 per cent.; sugars, 16.2 per cent.; cellulose and seeds, 1.3 per cent.; ash, 0.7 per cent.; gum and mucilaginous matter, 0.8 per cent. The peel contained: water, 86.0 per cent.; nitrogenous bodies, none; fats, 0.1 per cent.; sugars, 5.4 per cent.; cellulose, 5.76 per cent.; gum, etc., 2.74 per cent. Dried figs contained: water, 57 per cent.; nitrogenous bodies, 41 per cent.; fats, 2.20 per cent.; sugars, 26.06 per cent.; cellulose, 8.0 per cent.; gum, 0.18 per cent.; ash, 2.52 per cent.—Pharm. Ztg., lv (1910), No. 30, 305; from Biochem. Ztschr., 1910, 263-265.

Spent Hops—Utilization as Cattle Food.—Clayton Beadle and Henry P. Stevens suggest the utilization of "spent hops" by subjecting them to the hydrolytic action of hydrochloric acid in a manner similar to that proposed by them (and patented) for the treatment of cotton seed hulls. The action of the acid is catalytical, none of it entering the composition of the food, though there is an actual waste of possibly 1 or 2 per cent. HCl on the weight of the product treated. After draining the spent hops, about 7 per cent. of material remains, which must be deprived of moisture, partly by hydraulic pressure and the remainder by heat, leaving, however, a little moisture before the addition of the acid, as the mass is more permeable in a semi-moist condition. The draining liquor was found to contain 8 to 10 per cent. of sugars, calculated on the weight of dried hops, which by drying down would form part of the food-stuffs. Some idea of the constituents of two samples after hydrolysis is gained from the following figures: Moisture, 9.16 and 10.51; ash, 6.08 and 6.89; hydrocyllulose, 33.62 and 26.52; fat, 6.39 and 10.71; protein, 19.35 and 21.30; carbohydrates, 25.4 and 24.07; food units (approx.), 89.8 and 104.1 Albuminoids in aqueous extract of the meal—2.05 per cent. No ill-effects have been observed from the use of this meal as food-stuff.—Chem. News, Oct. 22, 1909, 197.

CONIFERÆ.

Turpentine—Acid Constituents.—According to the investigations of Stanislaus Leskiewicz the oleo resins of *Pinus silvestris* and of *P. maritima* contain an acid, *sapinic acid*, which is easily obtainable in a pure condition, but is readily changed in its rotatory power and action under the influence of heat. For this reason the acid, which is lævorotatory when obtained from the turpentine itself at a temperature not exceeding 60° C., is much weaker in its rotatory action, and may even be dextrorotatory, if obtained from the corresponding colophonium. By traces of hydrochloric acid, sapinic acid is converted into the acids of the sylvic series, of which at present only l-sylvic acid has been prepared. By distillation both this acid and sapinic acid are isomerized into the same

l-colophonic acid as that composing the crystallized acids found in rosin oil. All of these acids have a composition corresponding to the formula $C_{20}H_{30}O_2$.—Pharm. Ztg., lv (1910), No. 38, 386; from Journ. f. prakt. Chem., 1910, No. 8-9.

Cypress Camphor—Identity with Cedar Camphor.—In their Report for October, 1904, Schimmel & Co. stated that the only difference between cypress camphor with m. p. 87° to $87^\circ C.$, and dextrorotatory cedar camphor was the optical inactivity of the former. At the same time they mentioned that, when subjected to the action of formic acid, cypress camphor yielded a dextrorotatory, and cedar camphor a lævorotatory, hydrocarbon. They now state that both these statements, so far as they relate to cypress camphor, require correction inasmuch as recently, on the occasion of working up a considerable quantity of material, it was shown that cypress camphor as well as cedar camphor is dextrorotatory, and, like the other, is converted into a lævorotatory hydrocarbon $C_{15}H_{24}$ by dehydrating agents. The opt. rot. of this hydrocarbon was found to be $-85^\circ 57'$. A solution of 2 Gm. cypress camphor (six times recrystallized) in 20 Cc. chloroform, gave $\alpha_D + 2^\circ 1'$ in a 200 mm. tube. This works out at $[\alpha]_D + 10^\circ 5'$. The value for cedar camphor observed at the time was $[\alpha]_D + 9^\circ 31'$ (in 11.2 per cent. chloroform solution). Cedar camphor and cypress camphor must therefore be regarded as identical.—Schimmel's Semi-An. Rep., April 1910, 46.

CYCADEÆ.

Macrozamia Spiralis, Miq.—*A Reputed Cattle Poison.*—E. M. Holmes has received some seeds of *Macrozamia Spiralis*, Miq., forwarded to the Museum of the Pharmaceutical Society by Mr. L. G. Tweedy. These seeds are known in Queensland as the "Burrawong," and are used by the natives as food, after prolonged washing, a kind of starch resembling arrow root being thus obtained. But some colonials who partook of a pie made from the seeds without washing them were all made ill. Mr. Tweedy states that if cattle eat the plant it causes partial paralysis of the hind-quarters, and causes the horns to grow in a coil over the face; but the cattle are not injured in any other way. They breed well, and the calves are unaffected, but the animals themselves deteriorate in value, as they cannot walk far. The plant grows 5 to 6 ft. high only, and is consequently in easy reach of the cattle. The stems yield a gum resembling tragacanth, but in small quantities only.—Pharm. Journ. and Pharmacist, Jan. 22, 79.

B. ANIMAL DRUGS.

Leeches—Care and Preservation.—Doering offers some practical suggestions based on a long experience in the care and preservation of leeches. He finds that a mixture of grass-roots, peat, clay and soil, properly

moistened, is the best material for their habitation, but points out the necessity also of feeding them occasionally, at specified intervals, to prevent them from starving and to keep them in vigorous health. Although it is commonly asserted that the leech can live without food for as long a period as 10 months, he considers it best to feed them at intervals of 5 months, establishing relays by keeping them in 2 separate compartments and changing them from one to the other every three months. In this way active leeches are always available in one of the compartments while in the other compartment the leeches are permitted to recuperate.—Pharm. Ztg., lv (1910), No. 14, 138.

Cantharides—Amount of Cantharidin in South African Species.—W. C. Colledge reports the results of cantharadin determinations in six South African species of cantharides received from the government entomologist (Pretoria), employing a modified form of the method described by Self and Greenish (see Proceedings, 1907, 820). The results are given as follows:

Mylabris oculata, Thunb.—The beetle is 30 to 35 Mm. long; it is black with two broad light-yellow bands, and has two spots of the same color on the wing-cases. The powder is brown, and possesses a characteristic odor. Yield of cantharidin, 0.615 per cent.

Mylabris holocericea, Kley.—The beetle is about 13 Mm. long; the body and wing-cases are covered with fluffy hair, giving the whole a greenish appearance. The beetle has three yellow bands and two elongated spots on the wing-cases; the edges of the wing-cases are yellow. Yield of cantharidin, 1.3 per cent.

Decatomia lunata, Pallas.—The beetle is 20 Mm. long; it has fluffy hair on the thorax and on the wing-cases. The body has three wavy yellow bands. Yield of cantharidin, 1.0 per cent.

Eletica wahlbergia, Fabr.—The beetle is 23 Mm. long, and has a very thin neck. The body, which is covered with short hairs, is black; the wing-cases are black, with a reddish-brown edge. The back of the head is reddish-brown. Yield of cantharidin, 0.32 per cent.

Cantharis vellata.—The body is about 20 Mm. long, and, like the wing-cases, it is covered with gray-colored hairs. Yield of cantharidin, 2.73 per cent.

Lytta coelestina.—The body, which is bluish iridescent with greenish iridescent wing-cases, is 23 Mm. long. Yield of cantharidin, 1.89 per cent.

The author also mentions that specimens of the Chinese blister fly examined by the same process showed 1.2 per cent. of cantharidin.—Pharm. Journ. and Pharmacist, May 28, 1910, 674.

Honey—Distinction of Natural and Artificial by the Content of Al-

bumin Bodies.—R. Lund finds that true and artificial honey may be distinguished by their albuminoid content as follows: To 20 Cc. of a filtered 10 per cent. solution of the honey in a Barth's tube (such as is used for the determination of tannin in wine), 5 Cc. of 0.5 per cent. tannin solution are added and the volume of the liquid adjusted to 40 Cc. After 24 hours the volume of the precipitate produced is read on the scale of the tube. With artificial honey this amounts to only 0.03 Cc., whereas natural honey will show from 1.4 to 2.3 Cc.—Pharm. Zentralh. 50 (1909) No. 38, 799; from Ztschr. f. Unters. d. Nahr. u. Genussm. 17 (1909), 800.

Mel Despumatum.—*Injudicions Method of the G. P.*—"Dr. B." regards it as a *sine qua non* that honey must not be boiled or evaporated if it is aimed to retain its delicate flavor and its constituents (particularly formic acid) intact. *It should only be diluted.* He has for some years conducted the process of purification, which he recommends for adoption in the G. P., as follows: The honey is stirred with one-half its weight of water and heated in a water-bath for several hours without any further addition whatever, or, better, alternately heated and cooled, because the substances causing turbidity conglobate better by the latter treatment than if continuously heated. The honey is then strained and adjusted to the proper specific gravity. In this way the honey is not absolutely bright, although clear in thin layers; but, what is more important, it retains the flavor perfectly, as well as all the formic acid originally present in the fresh honey.—Pharm. Ztg., lv (1910), No. 23, 232.

Beeswax.—*Adulteration with Ceresin*.—Dr. C. Jacobsen reports as the result of an examination of 20 samples of white and yellow beeswax on the market that only two were found pure. All others were adulterated more or less, most frequently with ceresin, which was found in quantities up to 45 per cent.—Apoth. Ztg., xxv (1910), No. 14, 113.

Beeswax.—*Detection of Tallow*.—A. Ostrogovich and S. Petrisor recommend the following method for the detection of tallow in beeswax: From 6 Gm. to 7 Gm. of zinc chloride is melted in a porcelain crucible, and then 1 Gm. of the wax is added. The crucible is covered with a lid, the under side of which has been wetted with two or three drops of a solution of 0.3 Gm. of phloroglucinol in 100 Cc. of concentrated sulphuric acid. The covered crucible is heated for thirty-five to forty seconds, and then the under side of the lid examined. If the sample of wax contained tallow the acrolein formed will have developed with the phloroglucinol reagent a reddish-violet color, which is intensified on addition of a few drops of alcohol. With pure wax only a faint brown coloration is produced. Very small quantities of acrolein produce only a yellow coloration.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 701; from Bull. Soc. Stiinte din Bucuresti, 18 (1909), 127, through Journ. Soc. Chem. Indust.

Beeswax.—*A Practical Mold*.—H. G. Posey constructs cheaply and

practically a mold for making different sized cakes of yellow wax by screwing the required number and sizes of seamless tin ointment boxes on a board, as shown by Fig. 62, a hole being first punched into the boxes to admit a properly-fitting screw.—Bull. Pharm., Jan., 1910, 29.

Klipzweet and Hyraceum—Two Curious South African Products.—J. Parry describes a curious South African remedial agent known by the Dutch farmers of the Cape Colony by the name of “klipzweet,” which literally means “rock sweat.” It is found gradually oozing out of chinks in the rocks or accumulating on the rock surface, or flowing over them until it hangs down like a fringe of pitch, and bears in general some resemblance to another curious South African product, “hyraceum,” resembling castoreum, which has long been known and used medicinally in the Cape Colony. Quoting indiscriminately from a companion paper, by W. Fröembling, “klipzweet,” when fresh, is black and sticky, extract-like, of not a disagreeable odor, and forms a more or less acid solution with water. Warmed in a test-tube, it melts easily, emitting faintly aromatic, colorless fumes, these getting later, when the heat is increased by direct flame, acrid, and at last, when incineration starts, smelling like burnt horn or hair. Further preliminary examination revealed the presence of a sweet substance resembling honey, besides a more or less wax-like fat, together with a fair amount of organic substance of vegetable or animal origin. The microscopic examination, both by Mr. Fröembling and Mr. Peringuey, a local authority, reveals the presence of pollen grains, particles of vegetable tissues, insects, or rather partly dismembered bodies of these, among which there was an abundance possessing bee-like features. In short, it seems highly probable that the so-called “klipzweet” is a product of some species of bee, much smaller than the ordinary Cape bee, to which the name *Apis pygmæa* may be appropriate. The exudation is made up of wax, honey, waste products of a hive, including dead insects and their parasites, as well as other secreta and excreta. The mineral matter in minute particles is partly dust, wiped from the wings and bodies of the insects, partly scraped from the rock with the adhering “klipzweet” by collectors. This substance is therefore quite distinct from

FIG. 62.



Practical Mold.

Hyraceum, which consists of the excreta of the rock-rabbit (*Hyrax capensis*), and constitutes its principal adulterant and substitute. Mr. Parry has obtained authentic samples of both hyraceum and “klipzweet” and gives the results of a comparative examination.—Pharm. Journ. and Pharmacist, Nov. 20, 1909, 632–633.

Silajit and Klipzweet—Allied Substances.—The publication of the pre-

ceding papers of Mr. Parry and Dr. Fröembling prompts David Hooper to call attention to a paper on "Silajit: An Ancient Eastern Medicine," which he communicated to the Asiatic Society of Bengal in 1903 (see Proceedings, 1904, 647), and now gives some further details suitable to follow the descriptions of klipzweet. In the first place, the names have identically the same meaning. *Silajit* or *silajatu* is derived from *sila* = a stone, and *jatu* = produce or essence; hence it may be regarded as a substance born of the rock, essence of stone, or literally "rock sweat." The localities in which this article is reported to be found are confined to Northern India. It is obtained from the lower, central, and upper range of the Himalayas, and in the Vindhyan Hills, and is procurable in Simla, Mussoorie, and Katmandu. Mr. Hooper describes three kinds of silajit met with in India, namely, white, black, and cream-colored. *White silajit* is of a mineral nature and is more or less pure aluminum sulphate. It is obtained from Nepal. *Black silajit* is quite a different article. As sold in the bazaars of Calcutta it is in form of dark brown or black cakes, tough and pasty in consistence, and has an odor resembling that of leather. *Cream-colored silajit*, received from Jeypur and Baluchistan, consists of crystalline compounds, and has a strong nauseous odor. It is evidently of animal origin, since various samples yielded from 54 to 64 per cent. of urea, and therefore probably consists of crude urea, or inspissated urine. Mr. Hooper has also received samples of silajit from Baluchistan under the names of *khatmolt* (rock smoke), *maskana churro* (hill juice), *maulai* and *mumiai*, found in inaccessible places in the Jalai and Tab Hills. But whatever this drug may be, it forms a favorite medicine with Hindu physicians. Indeed, the author of "Charaka" says that there is no curable disease which will not yield to "silajatu" in judicious combination with other drugs.—Pharm. Journ. and Pharmacist, Jan. 8, 1910, 24.

Cod Liver Oil—Suggestion for Storage.—F. M. Apple directs attention to a simple and inexpensive method of the storage of cod liver oil, whereby the sweet natural odor of the oil is preserved and the tendency for it to acquire a fishy odor and taste is prevented. He uses for this purpose half-pint and pint bottles which formerly contained proprietary preparations, cleaning them thoroughly and sterilizing them before use. These are filled in sufficient number to completely exhaust the original contained when first opened, and, being then well corked with a good sound cork are set aside in a cool dark part of the cellar, to be drawn upon one at a time as demand arises.—Apothecary, March, 1910, 22.

Dried Egg Yolk—Spurious Commercial Sort.—Bordas and Tonplain state that granulated and dried yolk of egg is now largely produced, and has a wide application. This has led to the appearance of fraudulent substitutes, which are nothing but casein colored with yellow aniline colors. The genuine egg yolk yields over 50 per cent. of fat to extraction with ether, and contains 14 per cent. of substances soluble in 95 per cent.

alcohol. The fictitious articles only yield relatively small quantities of soluble matter with both these solvents.—Pharm. Journ. and Pharmacist, April 9, 1910, 455; from *Rèp. de Pharm.*, 22 (1910), 115.

INORGANIC CHEMISTRY.

GENERAL SUBJECTS.

U. S. P. Chemicals—Manufacture and Official Tests for Them.—George D. Rosengarten, referring to the decided change in conditions surrounding the manufacture of U. S. P. chemicals, brought about by the legalization of the U. S. P. as a standard, says that while the manufacturers have always desired to attain the highest purity for their product, it was not practicable in many instances to comply with the U. S. P. requirements until the "Corrections and Additions" to the Pharmacopœia were promulgated (in 1907), which has made compliance possible, with some few exceptions, in so far as chemicals are concerned. There is, however, still ample scope for revision, and the directions in which this needs to be accomplished by the study of all the subjects relative to the U. S. P. and medicinal chemicals in particular is admirably pointed out and discussed in his paper on the "Manufacture of U. S. P. Chemicals and Criticisms of U. S. P. Tests for the Same," read at the November meeting (1909) before the Scientific Section of the Philadelphia Branch of the A. Ph. A., which is published in *Amer. Journ. Pharm.*, Jan., 1910, 27-32.

The Purity Rubric and Tests of the U. S. P.—Necessity for Quantitative Methods.—Atherton Seidell and M. I. Wilbert, discussing the purity rubric and the tests of the U. S. P. VIII, direct attention to the importance of an accurate description of the tests—qualitatively and quantitatively—for determining the purity of medicaments within the requirements of the purity rubric established as the standard. As a practical demonstration of the possibility of elaborating efficient yet simple quantitative methods, the authors communicate a number of laboratory notes on some of the pharmacopœial compounds examined in the Division of Pharmacology of the Hygienic Laboratory (U. S., P. H. & M. H. Service), in a paper read in the Division of Pharmaceutical Chemistry of the American Chemical Society, Dec., 1909, which is published in the *Amer. Journ. Pharm.*, Feb., 1910, 63-68.

Quantitative Tests of the U. S. P. VIII.—Frank X. Moerk has worked out a practical classification of the quantitative tests of the U. S. P. VIII, in which all of the quantitative determinations based on similar methods are grouped together, so that it will not be a very difficult matter to formulate methods applicable to entire groups. The numerous tables in this

very comprehensive work are elucidated by comments applying to the special methods involved. The paper covers 21 pages of the "Proceedings," 1909 (from p. 919-939).

Exsiccated Salts of the U. S. P.—Precaution in Keeping.—Chas. H. LaWall, purchasing samples of exsiccated salts with the object of determining the amount of moisture, if any, contained in them, found that it was exceedingly difficult to obtain U. S. P. exsiccated salts, and that in most cases salts known as "dried and powdered" were substituted without anything being said to the purchaser. His experiments showed the following percentages of moisture in salts supplied as exsiccated: Sodium Carbonate, 4.01 per cent; Sodium Phosphate, 17.70 per cent; Sodium Sulphate, 4.10 per cent.; Ferrous Sulphate, 2.15 per cent.; Exsiccated Alum, 9.9 per cent. In further experiment, these salts were made perfectly anhydrous and then exposed to determine the amount of moisture absorbed during a certain period. This proved to be considerable, and the author therefore proves, (1) the necessity of the pharmacist investigating his exsiccated salts when purchasing them, and (2) the necessity of preserving them when right in moisture-proof containers.—Proc. Penna. Pharm. Assoc., 1909, 369-371.

OXYGEN.

Ozone—Question of Formation of Ultra-violet Light—Bordier and Nogier have stated that ozone is not formed by the ultra-violet light of a quartz lamp, and they say that the smell observed in the neighborhood of a burning quartz mercury lamp is not due to ozone, but to the effect of free electric discharges upon the olfactory nerves. Franz Fischer has how, however, actually condensed the ozone by means of liquid air, and has identified it by the violet coloration it produces on tetra methyl base papers as well as by its characteristic smell. He has also determined it quantitatively by leading it through potassium iodide solution and then titrating.—Chem. News, Aug. 27, 1909, 107; from Ber. d. D. Chem. Ges., 42 (1909), No. 10.

Ozone—Luminosity.—M. Beyer finds that phosphorescent luminosity in the dark is imparted to ozonized oxygen if it is heated to a temperature of about 350° C. The author regards this phenomenon as being evidently due to energy liberated by the conversion of the ozone, manifesting itself partly as light. He concludes that it is probable that in all transformations of true peroxides, favorable conditions for the manipulation of light are produced; so, for example, also in the luminosity of phosphorus and by the photochemical activity of hydrogen dioxide.—Pharm. Ztg., lv (1910), No. 29, 291; from N. Chem. Zentral-Bl., 1910, No. 9.

HYDROGEN.

Hydrogen—Industrial Production.—Discussing the various methods in

use for the production of hydrogen for ærial navigation, Professor H. Strache, after mentioning the well-known methods of the electrolytic decomposition of water and by the reaction of sulphuric acid and iron as being unsuited for the economic production of the gas in quantities, calls attention to the method of hydrogen production by the decomposition of water vapor with iron at a red heat, which has long been employed in Berlin by the division of Military Aeronautics. The method, however, consumes great quantities of iron, and has therefore been economically improved by regenerating the metallic iron from the ferric oxide produced by subjecting the latter to the action of a current of hot generator gas. This method has since been modified, by conducting the process in close retorts and effecting the reduction by means of water gas. Other methods which have been economically and successfully used for the industrial production of hydrogen, depend on the decomposition of slaked lime by iron: $\text{Ca}(\text{OH})_2 + \text{Fe} = \text{CaO} + \text{Fe}_2\text{O}_3 + \text{H}_2$, or, by means of carbon: $\text{Ca}(\text{OH})_2 + \text{C} + \text{H}_2\text{O} = \text{CaCO}_3 + 2\text{H}_2$. Furthermore, a perfectly pure hydrogen (100 per cent.) is obtained by a new method, which depends on the ability of potash-lime to absorb water gas (composed of carbon oxide and hydrogen) at 180°C ., and to part with pure hydrogen when the heat is increased to 300°C . This method is particularly adapted for the production of hydrogen in the field, for which purpose at present the decomposition of sodium hydroxide by silicon ($\text{Si} + 4\text{Na}(\text{OH}) = \text{Na}_4\text{SiO}_4 + 2\text{H}_2$) is employed, because of the easy transportation of the material—the principal objection to the latter being the inconvenient frothing of the soda lye. Pharm. Ztg., lv (1910), No. 19, 190; from Oesterr. Chem. Ztg., 1910, No. 4.

Hydrogen—Action in Nascent and Dry Condition.—It is found by A. C. Vouonassos that perfectly dry hydrogen in the nascent condition will combine with many elements and compounds with which, under ordinary conditions, it will not unite. Hydrogen is obtained in this state by heating anhydrous sodium formate to 400°C . The substance under experiment is mixed with the salt, and the mixture heated in an atmosphere of dry hydrogen. Under these conditions amorphous phosphorus gives pure phosphoretted hydrogen; sulphur forms hydrogen sulphide; arsenium, arsenuretted hydrogen; antimony gives a little antimonuretted hydrogen when antimonite is heated with sodium formate. Silicon does not react, but its salts give a little hydrogen silicide. Boric anhydride heated in an iron tube with metallic sodium and sodium formate gives a little gas which is probably hydrogen boride. Nitrites thus treated give ammonia; cyanides, hydrocyanic acid; and alkali carbides, acetylene.—Pharm. Journ. and Pharmacist, Mar. 26, 1910, 398; from Compt. rend., 150 (1910), 465.

Water—Decomposition by Ultra Violet Rays.—Kernbaum having noted the formation of H_2O_2 when water is submitted to the action of radium

β -rays, now finds that ultra violet rays have the same effect. Courmont and Nogier had previously observed that water becomes sterile when exposed to ultra violet rays. According to Kernbaum's experiments, when 15 Cc. of distilled water were exposed to these rays from a Heracus lamp for 200 hours, 26 Cc. of gas was liberated, which proved to be hydrogen, and the water contained H_2O_2 . The decomposition, however, does not appear to be continuous; it ceases after attaining a maximum, and no gas appeared to be formed during the last thirty-five hours of the exposure. The reaction may be expressed by the equation, $2H_2O \rightarrow H_2O_2 + H_2$. These results accord with the facts published in 1874 by Schoene, who demonstrated that hydrogen peroxide occurs in rain and snow water, and that greater quantities are present during the day than at night, and that none is found in dew.—Pharm. Journ. and Pharmacist, Sept. 4, 1909, 319; from Compt. rend., 149 (1909), 273.

Drinking Water—Sterilization by Light.—The practical application of the bactericidal action of the light of mercury-vapor quartz lamps to sterilizing drinking water has been carried out at Lyons by Nogier. It is proved that rays of short wave length possess a bactericidal action on water within a radius of 30 Cm. from the source of light, at which distance pathogenic microbes are destroyed by one minute's exposure. The effect is more marked when the lamp is immersed in the water. Complete sterilization in one to two minutes of about 26 gallons of water contaminated with colon and typhoid bacilli was obtained by immersing the lamp in the tank. Water thus sterilized has no action on the development of aquatic plants and animals; its chemical constituents and salts are unchanged; and it keeps sweet well. The presence of colloid matter in the water hinders the process of sterilization. Thus, in the presence of peptone solution, sterilization was not achieved after ten times the length of exposure. The author denies that oxidation has anything to do with the sterilization of water; it is to be attributed solely to the action of light.—Pharm. Journ. and Pharmacist, April 16, 1910, 482; from Archives d'Electricité Médicale, 10 (1910), 1, through Brit. Med. Journ., 1910, 1, 403.

Sterilization of Water—Experiments by Means of Violet Rays.—Continued investigation by Billon Daguerre shows that the mercury lamp is neither the most economical nor the most efficient source of ultra-violet rays for sterilizing water. The radiant energy derived from the passage of an induction current from a small Ruhmkorff coil giving a spark of 15 Mm., through rarified hydrogen in a quartz tube, gives off ultra-violet rays in such quantity and of such high bactericidal power as to completely sterilize 5 liters of polluted Seine water per minute. The water used was inoculated with *Bacillus coli* culture; before exposure to the rays it showed 29,000 colonies per mil. After one minute's exposure, cultivation failed to show a single colony. No rise of temperature takes place by

this method, and the bulk of the energy used is given off as bactericidal ultra-violet rays. With the mercury-lamp, on the contrary, not more than 20 per cent. of the total energy used is given off in this form.—Pharm. Journ. and Pharmacist, March 26, 1910, 398; from Compt. rend., 150 (1910), 479.

Sterilisation of Water with Ozone—Avoidance of Metals in the Production of Ozone.—Ed. Bonjeau has observed that in large installations for ozonizing air appreciable amounts of oxides of nitrogen are formed, and he has succeeded in determining the successive stages of their formation. Ferric oxide is first formed without nitrification. The oxide thus formed in the finely divided state favors the production of nitrous vapors, which are then transformed into nitric acid, and attack the lead or iron of the ozonizers. Hence the use of these metals should be altogether avoided.—Chem. News, Sept. 24, 1909, 160; from Compt. rend. 148 (1909), No. 26.

Distilled Water—Presence of Copper.—Attention is directed by a writer in "Pharm. Ztg." to the fact that the distilled water supplied by Mineral Water manufacturers (in Germany invariably) contains traces of copper. These distillates will pass muster on all the requirements and tests of the Germ. Pharmacopœia: but if five or ten liters of the water are percolated slowly drop by drop through a cotton filter moderately compacted in the tubular of a large funnel, the cotton acquires a lively green color, and readily gives the coppor reaction with H_2S or with potassium ferrocyanide.—Pharm. Ztg., liv (1909), No. 67, 651.

Commercial Distilled Water—Oxidizing Action.—L. Tixier finds that ordinary distilled water, although answering all the requirements of the French Pharmacopœia, exerts distinct properties of an indirect oxydase. It gives a blue reaction with fresh tincture of guaiac and acetic solution of benzidine in presence of hydrogen peroxide, and reacts with Meyer's phenolphthalein reagents. It loses this property when redistilled from a glass retort. It is, therefore, supposed that its oxidizing reactions are due to extremely minute traces of copper derived from the distilling plant, although the amount of the metal present is not sufficient to give reactions by ordinary tests. Mineral waters, well, river, and tap-water do not give these reactions.—Pharm. Journ. and Pharmacists, May 21, 1910, 645; from n épert. de Pharm. 22 (1910), 160.

Peroxide of Hydrogen—Preservation with Acetanilide.—A. R. L. Dohme and H. Engelhardt have examined a number of samples of peroxide of hydrogen from different manufacturers which had been preserved with acetanilide, and in most cases found that the preparation smelled strongly of nitrobenzene, showing that a decomposition had taken place. The authors conclude that on this ground the use of acetanilide as a preservative for peroxide of hydrogen is unsuitable, the recent claim to the con-

trary notwithstanding. Other preservatives that have been proposed are boric acid, sodium chloride, magnesium chloride, or calcium chloride, and free acids—the latter being, in the opinion of the author, the most suitable if it should be decided that acentanilide is unsuitable. They strongly recommend the use of an excess of either sulphuric or phosphoric acid, inasmuch as these two acids are not likely to be acted on by the peroxide, and the amount of free acid should be increased to about twice the amount at present permitted in the Pharmacopœia.—*Amer. Journ. Pharm.*, Feb., 1910, 69-71.

Hydrogen Dioxide—New Colorimetric Test.—Denigès points out that an entire series of phenol-like bodies—such as phenol, resorcinol, pyrogallol, etc.—give with hydrogen dioxide and sulphuric acid more or less intense color reactions. A very distinct and characteristic reaction, which he regards as being available for the detection of H_2O_2 , is obtained with guaiacol. If 0.3 Cc. of a 5 per cent. alcoholic solution of guaiacol is added to 2 Cc. of concentrated sulphuric acid containing a single drop of 10 per cent. H_2O_2 solution, a handsome blue-green color is produced. If quinine is used in this test, in place of guaiacol, an intense yellow color is produced.—*Pharm. Ztg.*, liv (1909), No. 68, 662; from *Journ. de Pharm. d'Anvers*.

Hydrogen Dioxide—Cobalt Naphthenate a Sensitive Reagent.—K. Charitschkoff has observed that the rose-red solution of cobalt naphthenate is changed to dark brown or olive-green in the presence of hydrogen dioxide and recommends this reaction as a sensitive and characteristic test for the latter. A strip of filter paper is saturated with the solution of the cobalt salt in benzin, and the rose-red paper resulting after drying is moistened with the liquid to be tested, whereupon it immediately assumes an olive-green color, distinctly visible in dilutions of 0.03 per cent. H_2O_2 . The reagent paper is not affected by the direct action of ozone.—*Pharm. Ztg.* lv (1910), No. 8, 78; from *Chem. Ztg.*, 1910, No. 7.

HALOGENS.

Bromine—Rapid Titration of its Solutions.—M. Mausier says that bromine may be estimated by its action on sodium formate, but the hydrobromic acid which is formed checks the reaction, and makes it too slow to be used as a test. This may be obviated by the presence of zinc oxide, which exercises no influence on the reaction except by neutralizing the acid. The method of procedure is as follows: Solution of sodium formate of a strength of 1.6125 Gm. per liter is prepared; this will be decomposed by an exactly equal volume of 3 per-cent. bromine water. Ten Cc. of this solution is placed in a flask of about 60 Cc. capacity, 0.1 Gm. of precipitated zinc oxide is added, and the bromine solution is then gradually run in with frequent shaking; a yellow tint lasting for one minute shows the end of the reaction. The amount of bromine mechanically

fixed by the zinc oxide and necessary to color the liquid is 0.018 Gm.; the volume of bromine solution used contains, therefore, 0.318 Gm. of bromine, from which its percentage strength can be calculated.—Pharm. Journ. and Pharmacist, January 1, 1910, 7; from Rép. de Pharm., Oct. 10, 1909, 437.

Chlorine—Preparation by Means of Ammonium Persulphate.—C. Matignon and R. Trannoy state that ammonium persulphate reacts in the cold with a solution of hydrochloric acid, giving a very regular stream of chlorine. A good yield is thus obtained, and the reaction may be utilized for the preparation of the gas. It suffices to run the acid onto the salt placed in a suitable flask fitted up for the purpose, to obtain after a few moments a constant current of the gas during the greater part of the reaction. No oxygen compounds of chlorine are produced.—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 81; from Bull. Commers., Nov., 1909, 527.

Chlorinated Lime—Estimation of Alkalinity in its Solutions.—K. J. P. Orton and W. J. Jones give the following directions for estimating the alkalinity of bleaching powder solutions: A known volume of approximately $\frac{N}{10}$ hydrochloric acid is placed in a Drechsel bubbler, and then a given volume of the bleaching powder solution is run in. A fairly rapid current of air, freed from dust, is now drawn through the liquid, the bubbler being carefully shielded from light. Aspiration for three-quarters of an hour suffices to free the liquid from chlorine (as shown by adding one drop of a 0.1 per cent. solution of methyl orange, which is bleached if any chlorine remain). The excess of acid is then titrated with $\frac{N}{10}$ sodium carbonate. In the case of solid basic hypochlorite (or compounds of calcium chloride and hypochlorite) the procedure is identical, except that it is more convenient to introduce the solid into the bubbler before the acid. The alkalinity of the solutions or solid is calculated from the following equations: $\text{Ca}(\text{ClO})_2 + 4\text{HCl} = \text{CaCl}_2 + 2\text{H}_2\text{O} + 2\text{Cl}_2$; and $\text{Ca}(\text{OH})_2 + 2\text{HCl} = \text{CaCl}_2 + 2\text{H}_2\text{O}$. The thiosulphate or arsenite titre $\frac{N}{10}$ of the bleaching solution gives directly the volume of $\frac{N}{10}$ hydrochloric acid reacting with the hypochlorite. It is necessary that no hypochlorous acid must pass over during the aspiration; it must entirely react with the hydrochloric acid. All the chlorine must be evolved as gas, and none reduced to hydrochloric acid. The hydrochloric acid must not react with chlorate at the dilutions used, and at the ordinary temperature.—Pharm. Journ. and Pharmacist, July 24, 1909, 105; from Analyst, July 1909, 317.

Chlorinated Lime—Inferiority on the German Market.—C. Jacobsen directs attention to the inferior quality of chlorinated lime supplied in Germany. On account of its cheapness, this product is largely used as a disinfectant, though it is produced in enormous quantities as a bleaching agent in various technical processes, being now made at a trifling cost

electrolytically in connection with caustic alkali manufacture. The author says that on the small scale a product containing 40 to 43 per cent. of available chlorine can be obtained, but the technical product contains 35 to 36 per cent.; the German Pharmacopœia, however, requires only 25 per cent. Examination of commercial specimens shows that most of them are much below even that moderate strength. Twelve samples were obtained in Jena from dealers of various kinds; two of these contained respectively only 0.6 and 1.0 per cent. of available chlorine, and consisted of chalk with a small admixture of chlorinated lime. Other samples contained from 3.1 up to 18.7 per cent., and only one out of the twelve contained over 20 per cent.; this one gave 29.5 per cent. as the mean of four analyses, and it was obtained from an apothecary. The author's observations point out the importance of frequent examinations of this product, which in cases of epidemic might prove useless as a disinfectant unless of a reasonably proper strength.—Apoth. Ztg., xxiv (1909), No. 94, 893.

Iodine—Determination in Albumin Compounds.—Fendler, Frank and Stüber find that the decomposition of organic matter necessary in estimations of iodine in its compounds with albumen, for example, ioglidin, is not difficult if not more than 0.5 Gm. of the substance is taken in operation. The substance is slowly heated with 2 Cc. of fuming nitric acid in a closed tube, at first for one hour to 100° C., then one hour to 150° C., and finally during six hours to 175° C.—Pharm. Ztg., lv (1910), No. 38, 385; from Ztschr. f. Unters. d. Nahr.-u. Genussm., 1910, No. 7.

Potassium Iodide—Non-occurrence of Iodate in the Commercial Salt.—The prevailing opinion, confirmed by the official tests of the pharmacopœias, that potassium iodate is a frequent impurity in commercial potassium iodide, is stated by L. W. Andrews to be a fallacy. The production of a blue color when a solution of the iodide is treated with hydrochloric acid and starch is by no means conclusive evidence of this impurity. A positive reaction will be afforded by this test in the presence of minute traces of iron or of copper, and these metals frequently occur as impurities in potassium iodide. The only reliable test for iodate is obtained when potassium acid tartrate (or tartaric acid, as in the B. P. test) is used as the acidifying medium, air being excluded. As a rule commercial potassium iodide does not contain more than 20 parts of iodate in 1,000,000 of iodide.—Pharm. Journ. and Pharmacist, Oct. 16, 1909, 474; from Journ. Amer. Chem. Soc., 31 (1909), 1055.

Hydrofluoric Acid.—Detection in the Presence of Fluorides.—W. Cronheim recommends the following method for the detection of hydrofluoric acid in the presence of fluorides, which is available in dilutions up to 1:800,000 in fruit juices or aqueous solution. The fluid under examination is mixed with a large excess of 95 per cent. alcohol which precipitates the fluorides quantitatively, while hydrofluoric acid remains in solution—prob-

ably also organic fluorine compounds. This operation is facilitated by the addition, also in excess of ether. The precipitate is allowed to settle in the cold, the liquid filtered after standing one hour, and rendered alkaline with lime or baryta water. After several hour's subsidence the precipitated calcium or barium fluoride is collected on a filter, incinerated, and the ash is tested by the usual corrosion method for hydrofluoric acid. Pharm. Ztg., lv (1910), No. 29, 291; from Bioch. Ztschr., 1909, 23, 143-145.

HELIUM.

Helium—Occurrence in the Gases from German Potash Beds.—Ernst Erdmann has collected and analyzed a specimen of the combustible gases generated from the carnalite of the Leopoldshall Salt Mines, and found them to consist of—hydrogen, 83.6 methane, 4.4; residue, 12.0 per cent. by volume. The residue contains considerable quantities of helium and some neon. It has been suggested that the iron chloride present in the rocks decomposes the water of crystallization of the carnallite, setting hydrogen free, while the oxygen oxidizes the iron salt to hæmatite. The author has found no experimental confirmation for this assumption, but suggests that radium salts were originally present in the salt deposits, and that by the action of their emanation on water hydrogen was set free and helium and some neon formed. This theory is confirmed by the occurrence of blue rock salt, the color of which is due to the action of radium rays on sodium.—Pharm. News, May 27, 1910, 251; from Ber. d. D. Chem. Ges., 43 (1910), No. 5.

SULPHUR.

Sulphurated Lime—Commercial Quality.—Of five samples of sulphurated lime assayed by P. M. Davis only one contained as much as 55 per cent. of calcium sulphide. The author had no difficulty to prepare a satisfactory product when C. P. calcium sulphate was used, but experienced great difficulty to prepare such from the commercial sulphate.—Amer. Journ. Pharm., May, 1910, 242.

Sulphites—Effect when used as a Preservative.—As a result of experiments by K. B. Lehmann and A. Trentlein on cats and dogs it would appear that the prolonged ingestion of minute quantities of sulphites is followed by no appreciable disturbance of the health. Doses of sodium sulphite, ranging from 15 to 62 Mgm. per kilo body weight, continued daily for 200 days, had no apparent effect, and did not cause the faintest indication of renal lesion. The animal organism can, therefore, oxidize such amounts of sulphites without harm. The use of sulphites should not, however, be permitted, in the author's opinion, since their use disguises the appearance of incipient decomposition and allows inferior materials to be used in the preparation of dietetic articles.—Pharm. Journ. and

Pharmacist, Jan. 22, 1910, 81; from Archiv. Hygiene, 1909, 303, through Nouv. Remèdes, 26 (1909), 320.

Anhydrous Sodium Sulphite—A Substitute for the Hydrated Salt now Official.—Although the U. S. P. requires that sodium sulphite ($\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$) should contain not less than 94 per cent. of this salt, it is the experience in the Hygienic Laboratory that the commercial salt contains as much sulphate as it does sulphite. Elias Elvove mentions a sample recently analyzed that consisted of 22.05 per cent. sodium sulphite, 25.00 per cent. sodium sulphate, and 52.50 per cent. of water, while a sample of the salt ($\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$) prepared in the Hygienic Laboratory, and showing a purity of 99.69 per cent. immediately after preparation, was found to have lost approximately one-fifth of the total available sulphite after standing six months in a glass-stoppered bottle, under ordinary conditions, and others have had a similar experience. On the other hand, anhydrous sodium sulphite, as pointed out by Hartley and Barrett, possesses stability so long as it is kept dry. A sample of anhydrous salt, obtained from the same wholesale firm from which the unsatisfactory sample of hydrated salt was obtained, assayed 96.5 per cent. pure Na_2SO_3 , and even the poorest sample examined assayed over 91 per cent. Furthermore, direct experiments made with seven samples of anhydrous salt, ranging when received from 91.25 to 99.00 per cent. pure Na_2SO_3 , showed on the average a loss of not more than 1 per cent. after being kept for 221 days, under ordinary conditions, in glass-stoppered bottles. The author therefore recommends that the hydrous sodium sulphite at present official in the U. S. P. be replaced by the anhydrous salt in the revised Pharmacopœia.—Amer. Journ. Pharm., May, 1910, 211–218.

Sodium Sulphite—Detection in Presence of Sulphate and Thiosulphate.—F. H. Weston suggests the following method for the detection of sodium sulphite in the presence of sulphate and thiosulphate: Prepare a solution of the substance in water of about 5 per cent. strength. To 5 Cc. of this solution add a solution of iodine in potassium iodide ($\frac{N}{10}$ iodine is most convenient); if decolorized continue till faint trace of iodine is obtained (presence of sulphite or thiosulphate or both); test this solution as to acidity, and if found to be acid the probable existence of a sulphite is indicated. To another 5 Cc. of the original solution add half the quantity of iodine solution as used in the first test, shake well, and test for sulphur dioxide by smell and by adding dilute potassium dichromate solution drop by drop. If pale green coloration is produced, sulphur dioxide is present, and hence a sulphite. If no coloration, then a thiosulphate is present. The sulphate can be detected by the barium chloride test, and the thiosulphate confirmed by the usual tests even in the presence of sulphite.—Chem. News, Oct. 8, 1909, 176.

Sulphates—Volumetric Estimation.—A. D. Mitchell and C. Smith rec-

commend the following volumetric method for the estimation of sulphates as being rapid and accurate: A convenient quantity of the sulphate is dissolved in water or pure hydrochloric acid (or, if necessary, dilute nitric acid) and a slight excess of standard $\frac{2N}{8}$ solution of barium chloride is added. After boiling, the mixture is rendered neutral by adding ammonium hydroxide; sodium acetate, acetic acid, and a slight excess of decinormal ammonium dichromate solution are added. The mixture is made up to 100 Cc., and 25 Cc. of the clear supernatant liquid is removed after the precipitate has settled, and titrated with vigintinormal ferrous-ammonium sulphate, using potassium ferricyanide as indicator. The first appearance of a green tinge is taken as the end-point. The method has been applied to ammonium, sodium, potassium, zinc, magnesium, and copper-ammonium sulphates, giving results accurate to about 0.2 per cent. In the case of potassium sulphate considerable absorption occurs (nearly 2 per cent.) which is minimized by boiling the precipitate for several hours with a little dilute hydrochloric acid, neutralizing with ammonium hydroxide, and proceeding as before. With copper-ammonium sulphate a well-defined end-point, at which a green tinge affects the predominating brown color of copper ferricyanide, can be found by practice. Excluding weighings, the authors state that five determinations can be made in an hour.—Chem. & Drugg. Jan. 15, 1910, 77; from Trans. Chem. Soc. Dec. 1909, 2193.

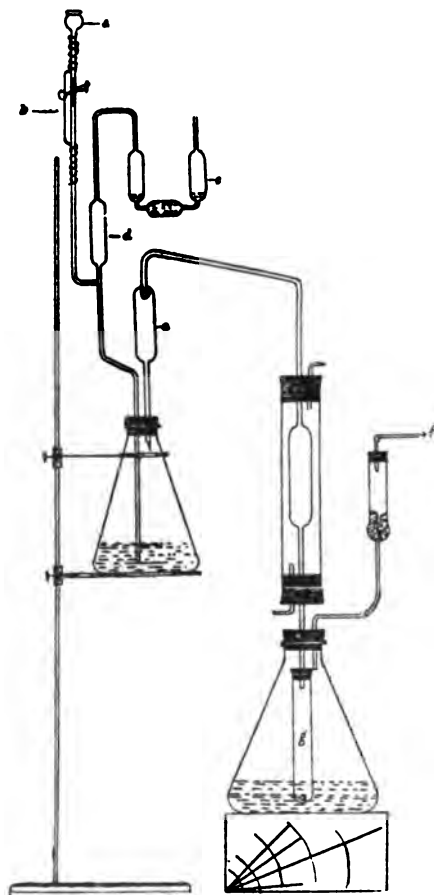
SELENIUM.

Selenium—Transformations.—According to the studies of Maurice Coste, selenium can exist at the ordinary temperature in three states: (1) Precipitated or vitreous selenium; (2) red crystallized selenium; (3) black metallic selenium. These three varieties are characterized by different densities. Metallic selenium dissolves easily in several solvents, *e. g.*, carbon disulphide, toluene, etc., and when a solution is rapidly cooled, red selenium is obtained. Vitreous selenium gives red crystallized selenium in presence of quinoline and of aniline. Vitreous selenium is transformed into metallic selenium at 98° C.; the author has studied the transformation by means of a dilatometer, and finds that in toluene it is completed in an hour. The density after the transformation = 4.62. (Density of vitreous selenium = 4.30.)—Chem. News, Dec. 24, 1909, 316; from Compt. rend., 149 (1909), No. 17.

Selenophosphates—Preparation and Properties.—Fritz Ephraim and Etta Majler have prepared selenophosphates of the alkalis, alkaline earths and magnesium by the action of phosphorus pentaselenide on the selenides of the metals, $3R_2Se + P_2Se_5 = 2R_3PSe_4$. The tetraselenophosphates were never obtained thus in the solid state, but they were gradually decomposed by the water, some of the selenium being replaced by oxygen according to the equations $R_3PSe_4 + H_2O = R_3PSe_3O + H_2Se$ or $R_3PSe_4 + 2H_2O =$

$R_3PSe_2O_3 + 2H_2Se$. Intermediate products of formula $R_3PSe_{4-n}O_n$ frequently resulted, and possibly compounds were formed which could yield an isomorphous mixture. The oxyselenides are also formed from metallic hydroxide and phosphorus selenide. In spite of excess of alkali the tertiary salts often hydrolyze to form secondary salts. They decompose in water, especially on warming, according to the equation $R_3PSe_4 + 4H_2O =$

FIG. 63.



Apparatus for Nitrogen Estimation.

$R_3PO_4 + 4H_2Se$. The mother liquors oxidize very readily in air, turning red with separation of selenium, but the dry salts are much more stable. When the mother liquor is completely removed they appear greenish-yellow. The selenophosphates of the alkalis are more easily prepared than those of the alkaline earths; only the secondary salts of the latter

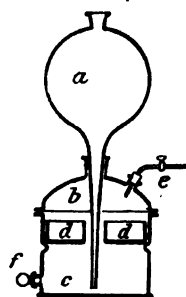
have been obtained. The properties of strontium selenophosphate are intermediate between those of the analogous barium and calcium salts.—Chem. News, April 8, 1910, 166; from Ber. d. D. Chem. Ges., 43 (1910), No. 2.

NITROGEN.

Nitrogen—Estimation with a Modified Apparatus by the Kjeldahl Process.—In distilling off the NH_3 in a Kjeldahl estimation, F. E. Weston and H. R. Ellis employed the modified apparatus shown by Fig. 63. After diluting the H_2SO_4 with water and cooling, NaOH solution was run through the thistle funnel (*a*), which is connected by a rubber tube with clip and held in place by a stout copper wire (*b*). The bulb (*d*)—about 10 Cc. capacity—was intervened to prevent any NaOH solution from coming in contact with the strong H_2SO_4 in the triple bulbs (*c*), which, in turn, were used to prevent any NH_3 from entering the apparatus when air was drawn through—the two side bulbs having a capacity of about 6 Cc., and the middle (horizontal) one 2 to 3 Cc. The trap (*e*) was to prevent any solid matter being carried over during the distillation—its capacity being 15 to 20 Cc. The bulb (*f*), containing broken glass, is connected with the pump, while (*g*) is a test-tube with a small hole at the bottom. During the distillation a steady current of air was drawn through the apparatus by the suction of the pump at (*f*); this enabled the distillation to proceed very smoothly, with absolutely no bumping, and very little attention was required.—Chem. News, July 30, 1909, 50.

Kipp's Apparatus—New Modification.—F. A. McDermott has constructed a modified form of Kipp's apparatus which presents a number of advantages over the usual form, and in particular that it is easily charged and cleaned, and is quite substantial. As shown by Fig. 64, the upper portion of the apparatus (*a*) is of the usual form; the lower portion, however, consists of two parts (*b* and *c*), joined by carefully ground surfaces, the semi-globular part (*b*) being provided with a lateral tubular fitted with a glass tube and cock (*e*) to carry off the generated gas. At a suitable height the walls of *c* are compressed so as to form an inner ledge on which a perforated circular tray (*d*) of porcelain or lead rests, for the reception of the material from which the gas is generated; while, near the bottom a stoppered tubular (*f*) is provided for withdrawing the liquid contents of *c* when the operation is ended.—Pharm. Ztg., lv (1910), No. 13, 129; from Chem. Ztg., 1910, No. 12.

FIG. 64.



Kipp's Apparatus.

Nitric Acid—Determination by Reduction with Aluminum Mercury.—Emm. Pozzi-Escot finds that aluminum mercury completely reduces nitric acid to ammonia, and thus affords a method which gives very good re-

sults in the analysis of soils and fertilizers. 4 to 5 Gm. of aluminum turnings are added to the nitrate, and enough of a saturated solution of mercuric chloride to wet it thoroughly. Then more water is added, and the mixture is left for a few minutes. When the action becomes rapid a little alkali is added and the ammonia is distilled off, some sodium hypophosphite being added at the end to decompose the mercur-ammonium compound which may have been formed.—Chem. News, Febr., 1910, 83; from Compt. rend., 149 (1909), No. 26.

Nitrohydrochloric Acid, Dilute and Strong—A Practical Suggestion.—In view of the time required in its preparation and the poor keeping qualities of "diluted nitrohydrochloric acid," A. A. Platt recommends that it be prepared as required from the strong acid, the preparation of which, in turn, can be reduced to 10 or 15 minutes instead of 24 hours, usually required to complete the reaction, by the application of heat (temperature not stated! Rep.) to the acid mixture. The acid made in this way assayed the same percentage of free Cl as that made in the usual way. The freshly made diluted acid deteriorated rapidly on standing in a warm place exposed to the light.—Amer. Journ. Pharm., May, 1910, 242.

Nitrosyl-Perchlorate—Formation and Properties.—K. A. Hofmann and Graf Arnim Zedtwitz state that when anhydrous nitric acid is added to the hydrate of perchloric acid ($\text{ClO}_4\text{H} + \text{H}_2\text{O}$), colorless difficultly soluble crystals are formed, which, however, are more easily prepared by conducting nitric anhydride into a solution of perchloric acid. Their formula is $\text{ClO}_4\text{NO} + \text{H}_2\text{O}$. They are only slightly hygroscopic, and deliquesce very gradually in moist air. An aqueous solution after warming gives both nitric acid and perchloric acid reactions. With amines nitrosyl perchlorate reacts very energetically, an explosion occurring if large quantities of substance are used. With phenols colored products are obtained; hence nitrosyl perchlorate can be used as a reagent for amines and phenols.—Chem. News, July 30, 1909, 59; from Ber. d. D. Chem. Ges. 42 (1909), No. 9.

ARGON.

Argon—Preparation from the Air.—F. Fischer and O. Ringe have worked out a method for the preparation of argon from atmospheric air. For the absorption of oxygen and nitrogen a finely powdered mixture of calcium carbide, 90, and calcium chloride, 10, is used at a temperature of about 800°C . The carbide mixture is first subjected to heat *in vacuo* to remove gases and tarry products. For the removal of hydrogen and hydrocarbons, the gas, after passing over the carbide mixture, is led over copper oxide at a red heat, solid caustic alkali, sulphuric acid, and phosphorus pentoxide. In this way it is possible to obtain within two days, with 7 Kgms. of calcium carbide, 11 liters of argon of a density 19.91.—

Pharm. Zentralh., 50 (1909), No. 52, 1083; from Bayr. Ind. u. Gewerbebl., 1909, 147.

PHOSPHORUS.

Phosphorus—Atomic Weight.—G. Ter Gazarian states that the determination of the atomic weight of phosphorus by chemical methods is attended by great difficulties, and that the better way is to find the density of a gas rich in phosphorus, for example, hydrogen phosphide, and from this deduce the molecular weight. A correction has to be applied for the deviation from Avogadro's law. The mean value of the atomic weight thus found is 33.930, which gives 30.906 as the atomic weight of phosphorus if $H = 1.008$. This value, 30.906, is the same as that obtained by Bernouilli by calculations based on the constitution of the chemical elements.—Chem. News, July 9, 1909, 24; from Compt. rend., 148 (1909), No. 21.

Phosphorus—Allotropic Modifications.—A comprehensive study and review of the literature on the allotropic modifications of phosphorus and the nomenclature pertaining to them, followed by numerous experimental examinations, lead Ernst Cohn and J. Olie to assume the existence of *two allotropic modifications* of phosphorus, which may be regarded as being dynamically allotropic: *a*, the white or yellow phosphorus, and *b*, the metallic or violet phosphorus. The so-called red phosphorus must be regarded as a solid solution of white phosphorus in the metallic. Not being a single body, the physical constants of red phosphorus are of no significance. Under the assumption advanced by the authors, numerous phenomena hitherto observed with phosphorus, are now easily and simply explained.—Pharm. Ztg., lv (1910), No. 29, 290; from Ztschr. f. physik. Chem., 71, 1-27.

Phosphorus—Allotropic States.—According to Pierre Jolibois, ordinary red phosphorus, obtained by heating yellow phosphorus, is in an unstable though definite state, and even at a temperature at which it is formed a catalytic agent is sufficient to transform it into a stable variety with a density 9 per cent. higher. This modification the author calls pyromorphic phosphorus. It may be obtained by the action of heat alone above $360^{\circ}C.$, and in presence of a catalyzer above $250^{\circ}C.$ Its density is 2.37. Red phosphorus can be fused by heating it to $725^{\circ}C.$ —Chem. News, Oct. 8, 1909, 184; from Compt. rend., 149 (1909), No. 4.

Hittorf's Phosphorus—Distinctive Difference from Red Phosphorus.—Alfred Stock and Franz Gomolka state that Hittorf's red crystalline phosphorus can very readily be crystallized from a solution of phosphorus in bismuth or in lead. In order to get the crystals from a lead solution it is best to employ electrolysis, by which means about one-third of the phosphorus used is obtained in the crystalline state. It is impossible, however,

to obtain the crystals quite free from all impurities. Hittorf's phosphorus can be prepared by sublimation if the differences of temperature in the different parts of the apparatus are made as small as possible. The density of Hittorf's phosphorus is less than that of ordinary red phosphorus, and there are differences in the chemical properties; for instance, ordinary red phosphorus reacts far more readily than Hittorf's phosphorus with sulphur, and the same difference is observed when they react with sulphur and iodine dissolved in carbon disulphide. Hittorf's phosphorus slowly oxidizes in the air, while ordinary red phosphorus undergoes a fairly rapid oxidation in air, differing from white phosphorus only in the rate at which the reaction occurs.—Chem. News, Febr. 25, 1910, 96; from Ber. d. D. Chem. Ges., 42 (1909), No. 17.

Phosphorus Hydrides—A New Solid Modification.—Alfred Stock, Willy Höttcher, and Walter Lenger describe the method of preparation and properties of the solid phosphorus hydride, $P_{12}H_6$, and of a new solid phosphorus hydride, P_6H_2 . The

Solid Phosphorus Hydride, $P_{12}H_6$, can be prepared by decomposing P_2H_4 by means of dry granular calcium chloride. The P_2H_4 is prepared by allowing water to act upon calcium phosphide. When freshly prepared the phosphide is a canary-yellow odorless amorphous powder with no action on litmus. It acquires an acid reaction when left in air, and then smells of phosphine. It is rapidly decomposed by light, a spontaneously inflammable gas being generated. It is insoluble in all the solvents tried, except liquid phosphorus hydride and fused phosphorus. Its physiological effects are due to the gradual evolution of phosphine. The

New Solid Phosphorus Hydride, P_6H_2 , is obtained by heating the yellow $P_{12}H_6$, prepared as above, to a temperature of $200^\circ C.$, when perfectly pure phosphine is evolved, which is not spontaneously inflammable. The residue left is an orange-red solid hydride of formula P_6H_2 , and the simplest equation expressing its formation is $5P_{12}H_6 = 6P_6H_2 + 6PH_3$. P_6H_2 is stable in dry air, but is converted into phosphine and phosphoric acid by the action of water. It is not attacked by cold water or dilute acids, but is oxidized by strong nitric acid. The same substance is obtained when liquid ammonia acts on $P_{12}H_6$, PH_3 being also generated. With liquid ammonia P_6H_2 gives a red, probably colloidal, solution which on evaporation leaves a black residue consisting of a compound of P_6H_2 and ammonia, having the character of a salt. The composition of this salt varies, the values obtained on analysis lying between those given by the formulæ $P_6H_2.NH_3$ and $(P_6H_2)_2.NH_3$. By warming the black substance or by treating it with acids, the P_6H_2 is regenerated unchanged.—Chem. News, Oct. 22, 1909, 208; from Ber. d. D. Chem. Ges., 42 (1909), No. 12.

Solid Yellow and Red Hydrogen Phosphide—Preparation.—The prepa-

ration of solid yellow hydrogen phosphide, $P_{12}H_6$, is usually effected by allowing calcium phosphide and water to react upon each other and passing the gaseous product into strong hydrochloric acid, in which it is deposited as a solid. A. Stock, W. Böttcher and W. Lenger have now determined that when spontaneously inflammable hydrogen phosphide is brought in contact with calcium chloride,

Pure Yellow Hydrogen Phosphide ($P_{12}H_6$) is at once separated in solid form. This, when freshly prepared, is a canary-yellow, amorphous powder, odorless and neutral, but on exposure to air acquires an acid reaction and the odor of phosphine. When heated gradually to 175° C. in a vacuum and maintained at that temperature until the evolution of gas is reduced to a minimum it is converted into.

Red Hydrogen Phosphide (P_4H_4)—the decomposition resulting according to the equation: $5P_{12}H_6 = 6P_4H_4 + 6PH_3$. The new hydrogen phosphide has an intense orange-red color, and is permanent if moisture is excluded; but when exposed to the open air its weight is increased and it gradually acquires an acid reaction, being converted into phosphine and phosphoric acid.—Pharm. Ztg., liv (1909), No. 65, 633; from Ber. d. chem. Ges.

Phosphorus Disulphide—Question of Existence.—Alfred Stock observes that if the curve of the sintering point (point at which drops of liquid appear) is plotted for mixtures of two substances, the composition of a compound can be detected far more clearly than from the melting-point curve. Moreover, the sintering point is very easy to determine and requires only a little material. The author applies this observation to the question of the existence of phosphorus disulphide (PS_2 or P_2S_4). The determination of the sintering-point curve of mixtures of P_4S_3 and P_2S_5 shows that a very marked maximum occurs, corresponding to the formation of a compound of formula P_4S_7 . This substance is also formed when a carbon disulphide solution of P_4S_3 and P_2S_5 is heated above 100° C. There is no indication whatever of the formation of a disulphide, and P_2S_4 is in all probability non-existent. The substances previously taken for $PS_2(P_2S_4)$ are mixtures of P_4S_7 and P_2S_5 .—Chem. News, July 30, 1909, 60; from Ber. d. D. Chem. Ges., 42 (1909), No. 9.

Tetraphosphorus Trisulphide, P_4S_3 —Preparation and Properties.—According to Alfred Stock, to prepare pure tetraphosphorus trisulphide 4 atomic weights of red phosphorus are carefully heated with 3 atomic weights of sulphur in an atmosphere of dry carbon dioxide. Thus a mixture of red phosphorus and P_4S_3 is obtained. The latter may be separated off by extraction with carbon disulphide, and the raw product purified by treatment with hot water. The purified sulphide can then be removed by filtration or by treatment with carbon disulphide. Its melting point is $171-172.5^\circ$ C. It is very soluble in carbon disulphide, forming a yellow solution. When finely divided it reacts energetically with caustic potash,

a very complicated reaction occurring in which large quantities of gas containing phosphine are set free.—Chem. News, Mar. 18, 1910, 132; from Ber. d. D. Chem. Ges., 43 (1910), No. 1.

Tetraphosphorus Heptasulphide, P_4S_7 .—Preparation and Properties.—To prepare tetraphosphorus heptasulphide (P_4S_7), Alfred Stock mixes 100 parts of red phosphorus with 173 parts of sulphur, and treats the mixture as in the preparation of P_4S_3 (which see). It is strongly heated for some time, and the cooled product is powdered and recrystallized from carbon disulphide. The low solubility of P_4S_7 in carbon disulphide is a property which distinguishes it from the other sulphides of phosphorus. The vapor density of the heptasulphide corresponds to the formula P_4S_7 up to about 700°C ., and above 750°C ., rapidly falls to the half value. The crystals of P_4S_7 are almost colorless with a faint tinge of yellow. They have no sharp melting-point, but fuse to a pale yellow liquid at $305^\circ\text{--}308^\circ\text{--}310^\circ\text{C}$. The boiling-point at 760 Mm. pressure is 523°C ., and the density at 17°C . is 2.19. P_4S_7 is much more sensitive to water than P_4S_6 , and smells strongly of sulphuretted hydrogen after standing in air for some time. It is slowly decomposed by cold water, and rapidly on warming. Alkaline liquids readily dissolve it in the cold.—Chem. News, April 8, 1910, 167; from Ber. d. D. Chem. Ges., 43 (1910), No. 2.

Phosphorus Dichloride—A New Compound.—By the action of electricity on mixtures of phosphorus trichloride and hydrogen, A. Besson and L. Fournier have obtained phosphorus dichloride, P_2Cl_4 . It is a colorless oily liquid having a smell of phosphorus. It forms a white solid at -28°C . It fumes in air, partly because it is decomposed by moisture, and also because it is readily oxidized, and often ignites spontaneously. It is unstable, but may be distilled in an inert gas at atmospheric pressure without undergoing much decomposition. It decomposes slowly at the ordinary temperature, giving a light yellow solid of composition P_2Cl_2 . Attempts to obtain the dibromide similarly have led to the formation of a yellow solid, which may be a decomposition product of the dibromide.—Chem. News, Mar. 4, 1910, 107; from Compt. rend., 150 (1910), No. 2.

Hypophosphorous and Phosphorous Acids—Reducing Action on Certain Metallic Salts.—A. Sievertz finds that aqueous solutions of hypophosphorous acid and hypophosphites are decomposed at ordinary temperatures by palladium; then reduced cobalt and nickel react, but gold, silver and copper require prolonged exposure at 100°C . to effect decomposition. Platinum black does not act as a catalyzor. Gold chloride reacts with both phosphorous and hypophosphorous acids, with separation of metallic gold. Cupric chloride is reduced to cuprous chloride by phosphorous acid. Phosphorous acid reduces cupric sulphate, with precipitation of metallic copper. Cupric sulphate and hypophosphorous acid react differently in varying proportions. If the copper salt be in excess metallic

copper is precipitated without any liberation of hydrogen; but if hypophosphorous acid is in excess copper hydride is precipitated. Platinum chloride is not reduced to the metallic state by hypophosphorous acid, but palladium chloride is quickly reduced in the cold. Nickel and cobalt salts are not reduced by either acid.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 671; from Ztschr. Anorgan. Chem., 64 (1909), 29.

Hypophosphoric Acid—Confirmation of Double Formula.—Results obtained by E. Cornec when the lowering of the freezing-point of hypophosphoric acid in aqueous solution is determined point very decisively to the double formula $H_4P_2O_6$, and this is confirmed by similar experiments with the potassium salt, as well as by a comparison of the conductivity of the neutral sodium salt with that of sodium pyrophosphate.—Chem. News, Mar. 4, 1910, 107; from Compt. rend., 150 (1910), No. 2.

Phosphoric Acid—Determination in Acid Solution with Alkaline Molybdate Solution and Glue.—According to A. Grete, phosphoric acid can be determined in acid solution by mixing with a solution of glue, adding ammonium nitrate and nitric acid, boiling, and allowing molybdic acid solution to drop into the mixture from a burette until a distinct precipitate remains. The solution is again boiled and well shaken, when a compact yellow precipitate settles. More molybdate is added, and the mixture is again boiled until the addition of molybdate no longer produces a precipitate. From the volume of molybdic solution thus used the percentage of phosphoric acid in the original solution can be calculated. The molybdic acid solution is prepared by adding a concentrated solution of molybdic acid in ammonia to nitric acid till the precipitate obtained does not dissolve, and adding ammonia. It is then titrated with a KH_2PO_4 solution; 1 Cc. of solution should equal 0.0025 Grm. P_2O_5 . The ammonium nitrate-nitric acid solution contains 200 Grms. of ammonium nitrate and 26.5 Cc. of nitric acid (sp. gr. 1.197) in 1 liter. The solution of glue has to be carefully made by allowing glue to stand in cold water, then pouring off the water and boiling with water and nitric acid; after cooling, the solution is made ammoniacal and any phosphoric acid present is precipitated with magnesia mixture. Then ammonium carbonate is added, and portions of the solution are filtered off as required.—Chem. News, Oct. 29, 1909, 220; from Ber. d. D. Chem. Ges. 42 (1909), No. 13.

BORON.

Borax—Proposed Elimination from Tinctura Rhei Aquosa and Sirup. Rhei, G. P.—Dr. O. Langkopf calls attention to the anomaly that, while the Imperial Health Office has pronounced borax as injurious to health and its use as a preservative for foods has therefore been forbidden, it is retained as a component of two preparations of the G. P., namely tinctura rhei aquosa and siripus rhei. An experimental inquiry into the probable necessity or utility of borax in these preparations (about 0.9 per cent. in

the tincture and 0.5 per cent. in the syrup) lead him to the conclusion that there is no necessity for its presence nor any advantage to be gained thereby, and he emphatically recommends its elimination from these preparations, if for no other reason, for its presence in them is in direct conflict with its own verdict by the health office.—*Pharm. Ztg.*, lv (1910), No. 23, 231.

SILICON.

Glass—Penetration by Gases.—In order to investigate the correctness of the statement of Zengheli that many gases or vapors of solid substances can pass through glass at the ordinary temperature, Alfred Stock and Hans Heyneman made the following experiment: A piece of silver foil was placed in a flask of ordinary glass, which was then exhausted. It was then left in a closed vessel in which iodine crystals were present. After three months nitric acid was added in order to see whether the silver dissolved completely, or whether any silver iodide had been formed owing to the penetration of the iodine vapor through the glass. It was found that there was no trace of iodide formed, and thus the statement of Zengheli appears to be incorrect.—*Chem. News*, July 9, 1909, 24; from *Ber. d. D. Chem. Ges.*, 42 (1909), No. 8.

Ferro-Silicon—Evolution of Poisonous Gases.—The "British Medical Journal" mentions that certain cases of poisoning from exposure on ship board to the fumes of ferro-silicon, which were at one time obscure, have now been thoroughly elucidated. In December last five such deaths occurred among Russian immigrants between Antwerp and Grimsby. Previously, in 1905, two children were fatally poisoned on a canal boat which had a cargo of ferro-silicon. It is now found that a ton of the material gave off 161 liters of phosphoretted hydrogen and 7 liters of arsenuretted hydrogen, so that the dangerous nature of such material as cargo is established. It should be shipped only in soldered, metal, gas-proof cases.—*Pharm. Journ. and Pharmacist*, July 17, 1909, 73; from *B. M. J.*, 1909, 2, 42.

CARBON.

Carbon—Composition of the Ordinary Forms.—H. Le Chatelier and M. Wologdine have performed many experiments in order to ascertain whether there are several varieties of ordinary carbon, which are the products of progressive polymerizations, and which have different densities and heats of combustion. They have found that in all varieties of ordinary carbon there is a considerable proportion of graphite, and they believe that there is only one variety of ordinary carbon of density about 1.8, the lower densities being due to the presence of included gases. It is not, however, possible to affirm with certainty the non-existence of several varieties of ordinary amorphous carbon.—*Chem. News*, Sept. 24, 1909, 160; from *Compt. rend.*, 148 (1909), No. 26.

Amorphous Carbon—Decolorizing Properties of Various Kinds.—In consequence of conflicting statements with regard to the decolorizing property of charcoal, some authors insisting upon a relationship existing between the chemical constitution of the carbon and its absorbent power, and others that the absorption power for "Crystal Ponceau" varies according to the proportion of nitrogen content, L. Pelet and C. Mazzoli have made a series of experiments, with a large number of decolorizing charcoals to elucidate the question. After determining the water and ash, the absorption results were taken as relating to 100 Gm. of the organic matter, first having shown that calcium carbonate, calcium phosphate, ferric oxide, etc., have no absorptive power towards the coloring matters. Sixteen samples were examined, comprising blood charcoal, bone charcoal, animal charcoal, wood charcoal, lamp-black, and decolorizing charcoal of Stassfurt, known as RT, ETB, and ET, these three last being manufactured by a secret process. The results of experiments made to determine any relationship between the nitrogen content and absorptive power show that no such relationship exists. The various samples were treated as follows: (1) Washed for a long time with hot distilled water; (2) heated repeatedly with concentrated hydrochloric acid to eliminate soluble mineral matter; (3) treated for three hours with hot concentrated sulphuric acid to destroy supposed cyanogen groups; (4) heated for three hours with concentrated solution of sodium hydroxide to eliminate NH_2 groups; (5) treated with sodium nitrite and hydrochloric acid to destroy NH_2 groups, then heated to boiling. After such treatment the samples were washed with water until the conductivity of the wash-water remained constant, this being necessary on account of the influence of electrolytes on the absorption of coloring matters. Examination of the samples thus purified showed that the decolorizing power had not sensibly been modified. The authors conclude that the absorbent power of decolorizing charcoal cannot be explained by the presence in it of nitrogen or of chemically active azotized groups.—Pharm. Journ. and Pharmacist, Dec. 11, 1909, 731; from Bull. Soc. Chim., Nov., 1909, 1011.

Animal Charcoal—Arsenic a Contaminant.—Bruno and Turquand d'Auzay, interested in the question whether the use of animal charcoal contaminated with arsenic might not impart a trace of this contaminant to wines when used as a decolorizing agent, have examined nine samples of animal charcoal. Three of these were perfectly free from arsenic; three contained only minute traces; the remaining three contained from 8 to 22 Mgm. of arsenic in 100 Gm. It was found, however, that when the animal charcoal containing the highest arsenical contamination was added to wine, in the proportion of 10 Gm. per liter, and allowed to macerate two weeks, the decolorized wine did not contain a trace of arsenic. It is therefore concluded that ordinary commercial animal charcoal, even when contaminated with arsenic, may safely be used as a decolorizing agent for

wines.—Pharm. Journ. and Pharmacist, April 2, 1910, 429; from *Répert. de Pharm.*, 22 (1910), 14.

Graphite—Estimation.—In a previous paper F. Browne has shown that the amount of carbon in graphite could easily be ascertained by means of a specially prepared iron oxide. The examination of a sample of "Acheson" graphite has confirmed the previous statement that the oxide of iron remains at the end of the estimation in the same condition as at the commencement. It was found that the prepared iron oxide after having been kept a year was still serviceable. Five Gm. of such heated in an open crucible to a pale red for an hour did not thereafter alter in weight, and was quite ready for an estimation. The "Acheson" graphite—grade No. 1,340, as made in the electric furnace—contained 0.158 of mineral matter and 0.170 of water, and its purity was 99.672 per cent.—Chem. News, Oct. 1, 1909, 162.

Lampblack—Inferior Commercial Quality.—F. H. Alcock directs attention to the inferior quality of the "lampblack" supplied on the market. According to good authority lampblack is "a deposited soot from the incomplete combustion of resin and tar." Neither of these contain much, if any, ash, and certainly less than 1 per cent. Yet the samples of lampblack, so labelled and wrapped in the familiar way, yielded from 8.6 to as much as 36 per cent. of ash, whilst other commercial blacks (mineral-black and ivory-black) yielded about 62 per cent. of ash.—Chem. and Drugg., Sept. 11, 1909, 443.

Solid Carbonic Acid—Formation of Pencils with Blotting-Paper Moulds.—Sinclair Tousey describes the following method for preparing pencils or crayons of solidified carbonic acid, which has lately attracted attention on account of its dermatological value in the treatment of naevus, lupus, warts, condylomata, moles and epitheliomata. He has devised for this purpose blotting-paper moulds, consisting of a hollow cylinder made by rolling several layers of blotting paper around a lead pencil or a glass vial, which is then removed. The blotting paper must be absorbent all the way through, not sized on one side, like so many advertising blotters. One end of the tube thus formed is tightly stoppered. The other end is placed tightly against the nozzle of the liquid carbonic-acid tank and wrapped around with adhesive plaster to make an air-tight joint. The carbonic acid cylinder employed is a small one, 18 inches long and 4 inches in diameter, and containing 5 pounds of the liquefied gas. It is laid on its side with the lateral nozzle turned downward. The liquid should be allowed to flow out into the porous paper tube. A portion immediately vaporizes and escapes through the meshes of the paper, producing cold enough to freeze the remainder. The liquid is allowed to flow very slowly, taking perhaps a minute to fill the tube. Turning it on full force would blow the tube off, and waste a great deal of the liquid. When

the mould is full of ice the liquid will begin to spurt out around the adhesive plaster, and the flow should then be turned off. The adhesive plaster being unwrapped, the porous paper cylinder will be found to contain a crayon of carbonic acid resembling very much the crayons used for writing on a blackboard. The blotting paper may be unwrapped from one end of the crayon so as to expose the latter. Or after waiting a short time the crayon will be found to have lost some of its substance by direct evaporation and to lie loose in the blotting-paper tube. The crayon may be made to protrude as much as desired by holding the tube upside down with something underneath to prevent the crayon falling out altogether. The blotting paper is flexible enough and a sufficient non-conductor of heat to serve as a handle for the crayon, which must not be touched by the naked hand.

It is not practicable to secure ice crayons with the carbonic-acid cylinder in an upright position, because then only the gas above the surface of the liquid could reach the nozzle and escape. None of the actual liquid would be let out of the tank in this way.—Pharm. Journ. and Pharmacist, May 28, 1910, 675.

True Percarbonates—Question of Existence.—Riesenfeld and Reinhold have observed that potassium percarbonate separates iodine from potassium iodide, while carbonates with hydrogen peroxide of crystallization do not. This, however, according to S. Tanator was to be expected, for the solution of potassium percarbonate contains potassium bicarbonate, while no bicarbonate is present in his sodium percarbonate. Hydrogen peroxide separates iodine from potassium iodide in presence of bicarbonates, while in presence of carbonates the iodine immediately yields salts of hypoiodous acid. These then decompose with evolution of oxygen. Since Riesenfeld and Reinhold added sulphuric acid to the solution, what they have determined is not the amount of iodine which results from the action of percarbonate on neutral potassium iodide, but the amount of iodine which is set free when percarbonate or hydrogen peroxide acts on hydriodic acid.—Chem. News., Mar. 18, 1910, 132; from Ber. d. D. Chem. Ges., 43 (1910), No. 1.

Monochlor- and Monobrom-Acetylene—Formation of Metallic Salts.—K. A. Hoffmann and H. Kirmreuther have prepared and describe several metallic salts of monochlor- and monobrom-acetylene. They find that mercuric tribromethylenide, $\text{Hg}(\text{CBr} : \text{CBr})_2$, prepared from acetylene tetrabromide, is very stable and forms characteristic crystals. Alkaline mercury cyanide solution gives with dichlorethylene a good yield of mercuric chloracetylde, $\text{Hg}(\text{C} : \text{CCl})_2$, which, when warmed with potassium cyanide and caustic potash, liberates perfectly pure chloracetylene. Bromacetylene can be prepared similarly. Both substances yield metallic compounds similar to those obtained with acetylene, and there seems to

be no reason for rejecting the usual formulæ $\text{CH} : \text{CCl}$ and $\text{CH} : \text{CBr}$. Besides the normal silver, copper, and mercuric salts, monochloroacetylene yields trichloromercury-acetic acid, $(\text{ClHg})_3\text{C}.\text{CO}_2\text{H}$, with mercury chloride. When chloroacetylene is led into ammoniacal silver nitrate solution, the white precipitate obtained very readily turns brown in air, and after being dried explodes. With cold saturated mercury chloride solution chloroacetylene gives *tris*-chloromercury-acetic acid, $(\text{ClHg})_3\text{C}.\text{CO}_2\text{H}$.—Chem. News., Jan. 21, 1910, 35; from Ber. d. D. Chem. Ges., 42 (1909), No. 16.

CYANOGEN.

Hydrocyanic Acid—A New Sensitive Test.—J. Moir having found the guaiacum test unsatisfactory and the phenolphthalin-copper test sometimes inapplicable, has succeeded in finding a reagent which will detect hydrocyanic acid in a dilution approaching one part in five millions of water. The test depends on the oxidation of a leuco-compound by nascent cyanogen resulting from the action of cupric copper on cyanides, but the author finds that none of the common leuco-compounds can be used. The reagent is made by adding small quantities of copper acetate and acetic acid to a warm solution of hydrocœrulignone (tetramethoxydiphenol) in a large quantity of water, digesting the mixture at 50° for a few hours, and filtering. The solution to be tested is rendered faintly acid with acetic acid (using sodium acetate also if a "strong" acid is present), and then treated with about one-quarter of its volume of the reagent. In solutions stronger than 1 in 100,000 an immediate crystalline precipitate of cœrulignone (red with purple luster) is obtained; with weaker solutions, a brick-red coloration. Oxidizing substances must, of course, be absent, but most of them can be avoided by applying the test on paper exposed to the vapor evolved by the liquid to be tested, as in the guaiacum test. A similar reaction is given by other tetra-substituted diphenols and by benzidine and its derivatives. Benzidine gives an indigo shade; dianisidine, bluish-green; and tolidine, a green shade. Although not so sensitive as hydrocœrulignone these reagents are more trustworthy and keep much better. The colors produced are all derivatives of so-called diphenosquinhydrone.—Pharm. Journ. and Pharmacist, June 18, 1910, 760; from Proc. Chem. Soc., May 14, 1910, 115.

Hydrocyanic Acid—Detection by means of Test Papers.—H. Barthe says that two kinds of test paper have been recommended for the detection of the vapor of hydrogen cyanide:—Guignard's picro-soda paper, prepared by dipping filter paper in a solution of 1 of picric acid in 100 of hot water, after adding to the solution 10 of sodium carbonate; this paper is colored red by hydrocyanic acid vapor; and Thiéry's phthalophenone paper, prepared by dipping filter paper in a solution of copper sulphate and then in an alcoholic solution of phthalophenone. This paper gives a rose color

with hydrocyanic acid vapor; but it has been asserted by Volcy-Boucher that this color is developed spontaneously on simply exposing the paper to the air at ordinary temperature, and recent experiments confirm this statement. It is, therefore, recommended that only the picro-soda paper should be employed for this test.—Pharm. Journ. and Pharmacist, Jan. 1, 1910, 7; from Bull. Soc. de Pharm. de Bordeaux, through Rép. de Pharm., Oct. 10, 1909, 440.

ALKALIES.

Potassium Hydroxide—Precaution in Purification by Alcohol.—A deficiency of KOH in a sample of potassium hydroxide purified by alcohol induced H. J. Henderson to ask the manufacturer for an explanation, who replied that it is impracticable to make a pure potassium hydroxide stronger than 85 per cent, KOH, because on the concentration of the solution in silver vessels, to cast the compound into sticks, this has to be done when about 85 per cent. strength is reached. If this precaution is not taken, the silver is attacked and contaminates the product. The exact point is, however, difficult to determine; hence a variation of 2–3 per cent. from this standard is unavoidable. Potassium hydroxide of technical quality, for which such metals as iron do not matter, can be made of about 100 per cent. standard of KOH.—Pharm. Journ., Nov. 6, 1909, 564.

Caustic Potash—Paraffin in Commercial Sticks.—F. Bengler calls attention to commercial stick caustic potash which had evidently been coated with a thin layer of paraffin, either used to prevent deliquescence, or possibly employed as a lubricant of the moulds. He has isolated 0.544 Gm. of viscous fluid paraffin from a kilo of the sticks. Attention is directed to the fact that the presence of this impurity might lead to error if such potash were used for the determination of unsaponifiable constituents in fats, and for similar tests.—Apoth. Ztg., xxv (1910) No. 24, 201.

Potassium Salts—Radio-Activity.—The examination by Emile Henriot and G. Vavon of the chloride and sulphate of potassium by the electrical methods confirms the hypothesis that the radio-activity of potassium is due to the element itself and not to an unknown impurity. The rays possess the penetration of β -rays, and, moreover, in a magnetic field they behave like a flow of negative electricity, and hence there is no doubt that they are β -rays.—Chem. News, Oct. 1, 1909, 172; from Compt. rend., 149 (1909), No. 1.

Potassium Carbonate—Degrees of Hydration.—M. de Forcrand, mentions that six hydrates of potassium carbonate have been described, viz., those with 4, 3, 2, $1\frac{1}{2}$, 1, and 0.5 H₂O, but that the only one which undoubtedly exists, or rather the only one which can always be prepared in ordinary conditions, is K₂CO₃.1.5H₂O. From experiments in which the heats of solution of K₂CO₃ and K₂CO₃.1.5H₂O were determined, it appears that the hydrate with 1.5H₂O is not a dehydrating agent, and for

dehydrating purposes the anhydrous salt should be used. The use of K_2CO_3 for dehydration demands certain precautions. It is possible that hydrates with 3 or 4 H_2O exist at low temperatures.—Chem. News., Sept. 24, 1909, 160; from Compt. rend., 148 (1909), No. 26.

Potassium Chlorate.—A. R. L. Dohme and H. Engelhardt discuss the subject of dangerous impurities in potassium chlorate which are liable to induce spontaneous explosion, in a paper which appears in the "Proceedings," 1909, 847-851.

Fused Caustic Soda—Action of Metals.—M. LeBlanc and L. Bergmann have studied the effect of metals on fused caustic soda. When this is heated in a gold vessel to $400^\circ C$. in an atmosphere of dry nitrogen it is readily dehydrated, and gives up no more water when the temperature is raised to $720^\circ C$. The average amount of water given up at $400^\circ C$. is 2.44 per cent. Evidently caustic soda does not dissociate at these temperatures according to the equation $2NaOH = Na_2O + H_2O$. Gold has no action on dry fused caustic soda in absence of air between the above temperatures. Silver and sodium liberate hydrogen, while platinum, copper, iron, nickel, aluminum, zinc, and magnesium generate hydrogen, and water is simultaneously formed. This double reaction may be explained on the assumption that the metal-sodium oxide compound resulting from the reaction, $Me + xNaOH = Me(ONa)_x$, forms a complex compound with sodium oxide, and that then the reaction $2NaOH = Na_2O + H_2O$ can occur. The gold vessel, when heated with copper and caustic soda to $700^\circ C$., yields an alloy which is not formed in absence of the alkali, and a gold-magnesium alloy has also been obtained similarly.—Chem. News, Febr. 25, 1910, 96; from Ber. d. D. Chem. Ges., 42 (1909), No. 18.

Sodium Carbonate—Rapid Determination of Bicarbonate Present.—B. Löüinger observed that in the production of sodium carbonate by electrolysis of sodium chloride, caustic soda sometimes occurred in the mother liquor, and was found later to have disappeared, showing that in the meantime some bicarbonate must have been produced. The best way of determining the latter was found to be to add to some of the liquor a known quantity of caustic soda, whereby any bicarbonate is converted to carbonate, then excess of barium chloride, which precipitates all the carbonate; then without filtering off the precipitate, the excess of caustic soda remaining in solution is titrated with standard acid, using phenolphthalein as indicator. The amount of caustic soda which has disappeared is equivalent to the bicarbonate that was present; if, on the other hand, the liquor contained some caustic and no bicarbonate the same titration will show the amount of caustic present. Any error due to carbonate in the caustic soda added is eliminated by a blank control test.—Pharm. Journ. and Pharmacist, Febr. 12, 1910, 173; from Chem. Ztg., Nov. 6, 1909, 1174.

Sea Salt—Source of Principal Supply.—Felix J. Koch says that much of the sea salt sold in the United States comes from Austria, where the government derives no little increment from the sale, for the taxes of certain localities are founded on this salt—plain, every-day sea salt. The seat of the Austrian salt industry on the Adriatic is at Capo d' Istria, but salt works are also operated at Pirano, Istria, Arbe, Pago, and Stogno, and with the exception of the Pirano plant, where a new method is being attempted, the systems are conducted at a tremendous profit. In the salt marshes of Capo d' Istria the process is rather simple, consisting of the old method of out-door evaporation. The sea water at this place contains about 3.75 per cent. of solid matter, about $\frac{1}{4}$ of which consists of common salt, which however is not deposited until the volume of the water is reduced $\frac{2}{3}$ of its original solution. Other salts besides the derived sodium chloride being likewise deposited, the concentrated brine is now drawn into a level field in the marsh which has been coated with clay to prevent the water seeping away from this into a second similarly prepared field, and so on through a series, until the liquor becomes so concentrated as to flow only sluggishly, until finally the separated salt may be gathered in little heaps and carted, when dry, into the bins. This interesting paper will well repay consultation in the original.—Merck's Rép., Nov. 1909, 286.

"Bush-Salt"—An African Condiment.—Lenz calls attention to "bush-salt" used by the natives in the regions of Africa where salt is scarce as a substitute for common salt and also as a medicine. It consists simply of the ash of several plants, prepared according to Tessmann from the leaves of *Halopegia azurea*, *Cystosperma senegalense*, and, rarely, of the *Raphia* palm. The sample examined by Regenstein contained 43.3 per cent. KCl, 27.5 per cent. K_2SO_4 , 16.26 per cent. K_2CO_3 , 0.85 per cent. NaCl, 8.25 per cent. H_2O and 3.34 per cent. insoluble substance containing Ca, Mg, Fe, Al, Phosphates, Silicates, Carbonates, and free (0.7 per cent.) Silica. The salt is brownish, hygroscopic and granular.—Pharm. Ztg., lv (1910), No. 46, 471; from Ber. d. Pharm. Ges., 1910, No. 5.

Ammonium Nitrate—Utility in the Analysis of Metals.—Ammonium nitrate melts easily at about $150^{\circ}C$. and begins to decompose at $210^{\circ}C$. L. Loviton finds that if, into the melted salt, in a test-tube or porcelain capsule, certain metals are introduced, particularly copper, zinc, or nickel, they are vigorously attacked and dissolved, whereas the other common metals such as iron, tin, and antimony remain unaffected, or only very slowly and slightly so. This fact may be made use of in certain cases, such for example where iron or steel is coated with copper, brass, or nickel, and a separation and estimation may be made in a few minutes. For this purpose, a weighed quantity of the sample to be tested (2 to 4 Gm.) is introduced into the fused ammonium nitrate and heated for a few moments until the reaction has terminated. On treating the "melt"

with water, the unaffected iron is separated, dried, and weighed, and the coating of copper, brass, or nickel determined by difference.—*Pharm. Journ. and Pharmacist*, Oct. 9, 1909, 451; from *Ann. de Chim. Analyt.*, Sep. 15, 1909, 328.

Ammonium Phosphate—Volumetric Determination.—Finding the quantitative requirements of the B. P. for the estimation of ammonium phosphate faulty, John M. Wilkie has worked out a volumetric method, which consists in a simple modification of his method for the determination of phosphoric acid in which the acetic acid, liberated on adding silver nitrate in the presence of sodium acetate, is titrated with standard alkali in the presence of phenolphthalein. In the experiments the ammonium phosphate employed was of a high degree of purity, though somewhat deficient in ammonia. Chlorides and sulphates were entirely absent—in fact the only impurity detected was a trace of sodium. For all the quantitative determinations a solution was prepared containing 13.209 Gm. per liter, this solution being $\frac{2}{10}$ for the ammonia and $\frac{8}{10}$ for the phosphoric acid ($\therefore \text{PO}_4$).

After various trials the following procedure was adopted :

Ten Cc. of the above solution was transferred to a round-bottom Jena flask (such as is used in Kjeldahl determinations), 30 Cc. $\frac{N}{10}$ NaOH was added, the flask clamped in an inclined position and boiled until the volume was reduced to about 5 Cc.; 30 Cc. $\frac{N}{10}$ H_2SO_4 was next added, and the contents again boiled for a few minutes to expel carbon dioxide. The flask was then cooled in running water, 3 to 5 Cc. 20-per cent. sodium acetate, and then 33 Cc. $\frac{N}{10}$ AgNO_3 added. The flask was corked and the contents well shaken, a few drops of phenolphthalein solution added, and then $\frac{N}{10}$ baryta was run in until a permanent pink tint was produced, most clearly seen when the precipitate is given a moment to settle.

The end point is sharp and permanent, and easy of recognition. If the salt is exactly 100 per cent., 30 Cc. $\frac{N}{10}$ Ba(OH)_2 will be required, and so the percentage is obtained by multiplying the number of Cc. consumed by $\frac{10}{3}$.—*Chem & Drugg.*, August 28, 1909, 379.

Nessler's Reagent—Preparation.—Dr. Friedrich Tretzel breaks a lance for the well-known Nessler's reagent as a test for ammonia, finding it extremely delicate for this purpose and perfectly replacing the more or less complicated methods that have been proposed. The preparation of the reagent is quite simple, and its efficiency is assured if the following directions are strictly followed: 5 Gm. mercuric chloride are dissolved by the aid of heat in 80 Cc. of distilled water and 30 Gm. potassium hydroxide are dissolved in 60 Cc. of cold water. Then 10 Gm. potassium iodide are dissolved with heat in 10 Cc. of distilled water contained in a 300 Cc. Erlenmeyer flask, and sufficient of the hot solution of mercuric chloride is added gradually, rotating the flask, until a faint turbidity sets in and dis-

appears slowly on further rotation. Now, a further addition of mercuric chloride is made very carefully by dipping a glass rod into the mercuric chloride solution and stirring the contents of the flask with it until a very faint permanent turbidity is produced—for, *if a decided permanent precipitate is produced, the mixture is worthless.* The liquid is now filtered, the solution of potassium hydroxide is added, followed by sufficient distilled water to make 200 Cc. Finally, 1 Cc. of the original mercuric chloride solution is added, the mixture is well shaken and, after subsidence, decanted clear into the reagent bottle. The reagent produces a distinct yellow color in water containing as little as 0.0125 Gm. ammonia in 100 liters.—Pharm. Ztg., liv (1909), No. 58, 568.

Thioformamide—Preparation and Properties.—Richard Willstätter and Theodore Wirth state that thioformamide (H.CS.NH_2) may be prepared by the action of phosphorus pentasulphide on formamide. An oily product is thus obtained, which exhibits the reactions of a thioamide. The isolation of pure thioformamide depends upon the fact that it yields a hydrate which is soluble in water, but unlike the oxygen compound, is extracted from an aqueous solution by means of ether. Thioformamide crystallizes in colorless prisms; which melt to a yellow oil at $28^\circ\text{--}29^\circ\text{C}$. It decomposes readily. With one mol. of hydrochloric acid it forms a salt which is also very easily decomposed. With chloroacetaldehyde it yields thiazol, and with bromethylamine the previously unknown "thiazolin." When heated it decomposes chiefly into sulphuretted hydrogen and hydrocyanic acid ($\text{H.CS.NH}_2 = \text{CNH} + \text{H}_2\text{S}$).—Chem. News, July 30, 1909, 59; from Ber. d. D. Chem. Ges., 42 (1909), No. 9.

Sulphamide—Conditions of Formation.—Fritz Ephraim and Mr. Gurwitsch observe that sulphamide belongs to the class of substances which are difficult to prepare, though their composition is simple. The authors have obtained a good yield of it as follows: They allowed sulphuryl chloride to drop into liquid ammonia surrounded by a freezing mixture. The reaction $2\text{SO}_2\text{Cl}_2 + 7\text{NH}_3 = \text{NH}(\text{SO}_2.\text{NH}_2)_2 + 4\text{NH}_4\text{Cl}$ then occurs rapidly, *i. e.*, the ammonium salt of imidosulphamide is formed. The mixture obtained is dissolved, acidulated, and gently warmed, and thus a mixture of ammonium chloride, amido-sulphuric acid, and sulphamide is obtained. The sulphamide is removed by adding dry acetic ether, in which it alone is soluble.—Chem. News, Mar. 18, 1910, 132; from Ber. d. D. Chem. Ges., 43 (1910), No. 1.

Rubidium and Cæsium Carbonates—Degrees of Hydration of the Neutral Salts.—M. de Forcrand has determined the heats of solution of the neutral carbonates of rubidium and cæsium, from which it appears that rubidium carbonate resembles potassium carbonate as far as the degree of hydration is concerned ($1.5\text{H}_2\text{O}$), while cæsium carbonate differs from them ($3.5\text{H}_2\text{O}$). Thus the formulæ are $2\text{M}_2\text{CO}_3 + 3\text{H}_2\text{O}$ for K_2 and Rb_2 and

$2\text{Cs}_2\text{CO}_3 + 7\text{H}_2\text{O}$. The results obtained when the hydrates of Rb_2CO_3 and Cs_2CO_3 are subjected to the action of heat seem to show that there are several hydrates between the monohydrate and the anhydrous salt, corresponding to different degrees of condensation of the molecule, but the author has not isolated these compounds. The anhydrous carbonates are powerful dehydrating agents, being even more active than anhydrous K_2CO_3 .—Chem. News, Oct. 1, 1909, 172; from Compt. rend., 149 (1909), No. 1.

Rubidia and Cæsia—Formation of Hydrates.—M. de Forcrand finds that when a concentrated solution of rubidia is allowed to evaporate in the cold crystals of formula $\text{RbOH} + 2.1\text{H}_2\text{O}$ separate. These are probably the hydrate with two molecules of water, still retaining some traces of mother-liquor. There is a complete analogy between potash and rubidia, except that the latter has a higher affinity for water, and is therefore a more effective dehydrating agent than potash. All attempts to isolate a dihydrate of cæsium have failed.—Chem. News, Febr. 18, 1910, 83; from Compt. rend., 149 (1909), No. 26.

ALKALINE EARTHS.

Alkaline Earths—Micro-Chemical Detection.—N. Schoorl describes micro-chemical tests for the detection of *barium*, *strontium* and *calcium*. The most characteristic micro-chemical reaction for *barium* is the formation of the fluoro-silicate. This salt is precipitated in a distinctive crystalline form from acetic acid solutions by means of ammonium fluoro-silicate. For *strontium*, the chromate is the most suitable salt for microscopic recognition; for *calcium*, the precipitation of calcium sulphate in typical crystals from acetic acid solution. The different solubility of the anhydrous chlorides in absolute alcohol may be employed for the separation of the salts, and these may be identified as anhydrous nitrates. Calcium may be detected in presence of strontium and barium by evaporating a few drops of the acetic acid solution to dryness with excess of sulphuric acid, incinerating the residue, and gently warming it with a little water. A few drops of the clear liquid are removed by means of a capillary tube, transferred to a micro-slide, treated with a trace of acetic acid, and allowed to crystallize.—Pharm. Journ. and Pharmacist, Sept. 11, 1909, 342; from Ztschr. Analyt. Chem., 48 (1909), 401.

Pure Calcium Carbonate—Preparation.—Dr. M. Kleinstück points out the difficulty of obtaining perfectly pure calcium carbonate on the market, the product supplied invariably containing traces of ammonium or sodium salts, depending on the precipitant used, while the temperature at which the precipitation is effected affects the amount of contaminant. He therefore describes and recommends the following method and process which secures a perfectly pure calcium carbonate: The hot calcium chloride solution is precipitated with ammonium carbonate and ammonia water,

the precipitate allowed to settle, and washed with hot distilled water, by decantation, until the washings no longer give a reaction with Nessler's reagent. Then, to remove the last traces of ammonium salts, the precipitate is heated repeatedly with perfectly neutral solution of calcium chloride and washed with distilled water until the washings no longer give a reaction for chlorine.—Pharm. Zentralh., 51 (1910), No. 4, 63–64.

Precipitated Calcium Carbonate—Copper Introduced by the Distilled Wash Water.—Having prepared some precipitated calcium carbonate according to the directions of the G. P., M. Lefeld found on subjecting the product to examination appreciable traces of copper, which, on further investigation, was evidently introduced by the distilled water employed for washing the precipitate. The distilled water was an industrial condensation product containing carbonic acid, which in contact with the copper condensing tubes had evidently acted upon the copper with formation of copper carbonate in solution. This, reacting with the calcium carbonate, is converted into insoluble basic copper carbonate, and to the extent of its presence contaminates the officially prepared product. Further experiments actually demonstrated that when water containing CO_2 is in contact with metallic copper, appreciable quantities of copper are dissolved, whereas distilled water, free from CO_2 , is without effect upon it.—Pharm. Ztg., liv (1909), No. 68, 662; from Ber. d. D. Pharm. Ges., 1909, No. 4.

Magnesia Usta, G. P.—Modification of Official Test.—H. Frerichs and W. Kroseberg record the results of an examination of ten specimens of calcined magnesia—seven obtained from pharmacists, two from manufacturers, and one designated as “chemically pure.” Only one of the samples responded completely to the demands of the G. P., which consist simply of the absence of impurities in excessive quantities, while two others very nearly responded to the official requirement. But in all cases there was a considerable variation in the alkalinity, which ranged from 86.30 per cent. to 94.80 per cent. MgO . The higher figure was attained with the so-called “chemically pure” sample, which however cannot be accepted as C. P. since it contains both iron and other heavy metals as impurities. The variation observed in the MgO content of the different samples, while partly due to the presence of magnesium as carbonate, is mainly due to moisture which is not taken into account by the G. P. tests of purity. The authors therefore suggest the following alkalimetric test for inclusion in the G. P. tests of purity of magnesia usta: “0.5 Gm. of the calcined magnesia is heated with 30 Cc. of $\frac{N}{T}$ hydrochloric acid and about 20 Cc. of water until solution is effected, a few drops of methyl orange solution added, and the liquid titrated with $\frac{N}{T}$ KOH , of which not more than 7.1 Cc. should be required to produce a yellow-red color.” This indicates a content of 92.5 per cent. of magnesium oxide—any calcium oxide and calcium or magnesium carbonate present being calculated and

included as magnesium oxide. This requirement can easily be complied with by the manufacturer, and maintained by the pharmacist by proper methods of preservation.—*Apoth. Ztg.*, xxiv (1909), No. 73, 679–680.

“Cork Metal”—Identification as Magnesium.—At one of the recent aeronautical exhibitions samples of a metal were shown under the name of “cork metal,” which was said to be 40 per cent. lighter than aluminum, and to have numerous other properties which should make it a rival of the latter. Great secrecy was maintained as to the nature of this wonderful metal, but its properties were such as to cause F. J. Willott to submit it to chemical analysis. In appearance the metal resembles very strongly the alloys known as magnalium. The surface presents a lusterless whitish-gray color, both sheets and bars showing the scorings and scratches so frequently found on badly rolled or drawn aluminum. Careful analysis gave the following result: Aluminum, 0.04; iron, 0.017; zinc, 0.48; sodium, 0.21; magnesium, 99.30 per cent. It will be seen, therefore, that essentially, “cork metal” is nothing but magnesium, to which a small amount of zinc has been added. Whether this latter has been purposely introduced or, as is more probable, is merely present as an impurity, the author cannot say. As the metal evolves hydrogen when immersed in water it was found necessary to use organic solvents for the determination of the specific gravity. In alcohol this was found to be 1.762, thus confirming the conclusion that cork metal is in fact magnesium.—*Chem. News*, Oct. 1, 1909, 162.

Electron—A Magnesium Alloy Lighter than Aluminum.—The following statements concerning the new metal “Electron,” which although of lighter specific gravity than aluminum is much stronger, is given in “Prometheus”: The new metal is a magnesium alloy of a silver-white color, which may be moulded, pressed, rolled, drawn and polished, but oxidizes rapidly on exposure to the air. Its specific gravity fluctuates between 1.75 and 2.0 (aluminum = 2.7 to 3.0). The melted and cast metal has a tensile strength of about 18 Kgm. to the square millimeter with about 5 per cent. of ductility, but by mechanical processes of condensation, such as pressure, rolling, drawing, etc., the tensile strength of the metal may be increased to about 35 Kgm. to the square millimeter and the ductility to 18 per cent. without appreciably raising the specific gravity. Further investigations of the specific properties of this interesting alloy are in progress.—*Pharm. Ztg.*, liv (1909), No. 98, 968.

EARTHS.

Group of Rare Earths—Review of Researches to Identify its Members.—Dr. G. Urbain briefly reviews the researches which have engaged his attention during the past fifteen years and were undertaken with the object of identifying the individual members of the group of rare earth metals, which, in accordance with the advance made since Sir William Crookes's

admirable researches preceding this period, are now recognized. These consist of the elements mentioned below in the order of the solubilities of of their salts, by means of which they may be separated from each other for identification. The chief obstacle in the separation of the rare earth is isomorphism : but this isomorphism has proven useful, in as much as bismuth, though not belonging to the rare earths, comes between samarium and europium as regards the solubility of its salts which are isomorphous with the corresponding salts of the rare earths, and bismuth thus acts as a separating element. This fact seems to the author to point to a great natural law relating to the solubility of the elements of the same series, He has frequently observed that whatever the method of crystallization employed, the rare earths arrange themselves in the same order. Moreover, if yttrium is excepted, this is also the order of increasing atomic weight, as shown in the following table arranged in the order of solubilities :

Lanthanum	La =	139.0
Cerium	Ce =	140.25
Praseodymium	Pr =	140.6
Neodymium	Nd =	144.3
Samarium	Sm =	150.4
(Bismuth)		
Europium	Eu =	152.0
Gadolinium	Gd =	157.3
Terbium	Tb =	159.2
Dysprosium	Dy =	162.5
Holmium	Ho =	> 162.5 < 167
Yttrium	Y =	89.0
Erbium	Er =	167
Thulium	Tu =	168.5
Neoytterbium	Ny =	172
Lutecium	Lu =	174

The principal results which the author has contributed to the chemistry of these rare earths are summarized thus : The discovery of two elements, *lutecium* and *neoytterbium*, and the complete description of four others, *europium*, *gadolinium*, *terbium*, and *dysprosium*. Although the author's conclusions are diametrically opposed to those of Sir William Crookes, to whose attainments he wishes to testify, his experiments have for the most part confirmed the results obtained by Sir William Crookes, and by them the chemistry of the rare earths has gained in simplicity what it has lost in charm. The experiments which Dr. Urbain has briefly described, dwelling only on the main principles, have led him to the following conclusions :

I. The elements S^d of Sir William Crookes, $Z\zeta$ and Z^e of M. Lecoq de Boisbaudran, are actually identical with Demarçay's europium. This element possesses an emission spectrum, an absorption spectrum, a phosphorescence spectrum (which appears only when the derivatives of

europium are mixed in suitable diluents). The atomic weight of europium is $\text{Eu} = 152.0$.

II. The element victorium of Sir William Crookes is identical with gadolinium. This element also exhibits the three sorts of spectra. The atomic weight is $\text{Gd} = 157.3$.

III. The elements Γ of Demarçay, Z^β and Z^δ of Lecoq de Boisbaudran, G^β , ionium, and incognitum of Sir William Crookes, are identical with terbium, the existence of which was foretold by Mosander, although it was not isolated and described till sixty years later. Its atomic weight is $\text{Tb} = 159.2$.

IV. The elements Δ of Demarçay, Z^α and Z^γ of Lecoq de Boisbaudran, G^δ of Sir William Crookes, X_2 of Exner and Haschek, are identical with Lecoq de Boisbaudran's dysprosium. The atomic weight is $\text{Dy} = 162.5$.

V. Marignac's ytterbium is a mixture of at least two elements. The atomic weight of one is about 174, and it has been defined by this and by a line and a band spectrum. This is *lutecium*. The residue of the old ytterbium the author calls *neoytterbium*. Its atomic weight has not yet been obtained constant; the mean atomic weight, however, is 172; but the author has observed such variations in its band spectrum that he is inclined to think that it is itself a mixture of two elements.—Chem. News, Aug. 13, 1909, 73-75.

Rare Earths—Magneto-Chemical Analysis.—G. Urbain says that in order to control the progress of the separation of the rare earths it is necessary to employ a property which varies in different terms more than the atomic weight. The coefficient of magnetization is such a property, and may conveniently be used for the purpose. Curie and Cheneveau's magnetic balance is a suitable instrument for taking the measurements, and either solutions or solid salts may be used. With an earth containing dysprosium and yttrium, for instance, it is easy to calculate the magnetization corresponding to each value of the atomic weight, and then to compare the theoretical curve with the experimental curve. The author has thus detected holmium and erbium in an earth containing yttrium and dysprosium. Thus, this method applied to the intermediate fractions obtained in the separation of two substances reveals the presence of another element which could not be detected by examining the spectrum.—Chem. News, June 10, 1910, 276; from *Compt. rend.*, 150 (1910), No. 15.

Rare Earths—Six New Elements.—In the course of an address before the recent convention of German chemists, Prof. Muthmann mentioned that Dr. Auer v. Welsbach has succeeded in splitting up terbium and thulium each into two distinct elements, and the rare earth-metals, dysprosium and gadolinium, each into three distinct elements, thus increasing the number of elements of the rare-earth group from 16 to 22. Dr. v. Welsbach has proposed the names "aldebaranium" and "cassiopeium" for two of these new elements, for which, however, the names proposed by

Urbain—"lutecium" and "neoytterbium"—appear to be accepted. The two investigators had independent of each other, but at the same time, succeeded in separating these two elements from ytterbium (see *Proceedings*, 1909, 265).—*Pharm. Ztg.*, lv (1910), No. 47, 480.

Bromates of the Rare Earths—Preparation.—As the new method for the separation of the yttrium earths recently proposed depends on the fractional crystallization of the bromates, and has given excellent results, C. James and W. F. Langelier have prepared and investigated some of the bromates of the rare earths. These are usually prepared either by dissolving the oxide of the element in bromic acid, or by the metathesis of the sulphate of the metal with barium bromate. The latter is the preferable method, since barium bromate is soluble in about 130 parts of cold water, and its solubility decreases enormously in the presence of the very soluble bromates. Thus we can employ an excess of barium bromate, and very readily obtain pure bromates by crystallization. Because the rare-earth sulphate solutions deposit crystals on heating, it is best to cover the barium bromate with water, heat upon the water bath, and add gradually, with plenty of stirring, the sulphate of the desired element. Under these conditions no difficulties are encountered, and the barium sulphate filters (off) well. The authors have in this way prepared and described the following rare-earth bromates: *Lanthanum bromate*, $\text{La}_2(\text{BrO}_3)_6 \cdot 18\text{H}_2\text{O}$; *Ceric bromate*, $\text{Ce}(\text{BrO}_3)_4$; *Praseodymium bromate*, $\text{Pr}_2(\text{BrO}_3)_6 \cdot 18\text{H}_2\text{O}$; *Neodymium bromate*, $\text{Nd}_2(\text{BrO}_3)_6 \cdot 18\text{H}_2\text{O}$; *Samarium bromate*, $\text{Sm}_2(\text{BrO}_3)_6 \cdot 18\text{H}_2\text{O}$; *Yttrium bromate*, $\text{Y}_2(\text{BrO}_3)_6 \cdot 18\text{H}_2\text{O}$. The anhydrous salts of these members of the Cerium group of rare earths are obtained by heating to 150°C ., with the exception of the praseodymium salt, which should not be heated above 130°C .—*Chem. News*, Aug. 20, 1909, 85–86.

Polonium—Heat Generated by its Salts.—William Duane has found that the heat generated by a salt of polonium amounts to 0.0117 cal. per hour. The ionisation produced by a polonium salt can be compared with that produced by a known amount of radium under the same conditions, and when this is done it is found that polonium and radium in quantities which give the same ionisation currents set free almost the same amounts of heat. This agrees with the hypothesis that the heat disengaged by these substances is due to the kinetic energy of the α -rays.—*Chem. News*, Aug. 13, 1909, 84; from *Compt. rend.* 148 (1909), No. 25.

Polonium—Successful Production of Helium from it.—It is known that among the new strongly radio-active substances polonium was the first to be discovered. Mme. P. Currie and A. Debiene say that many efforts have been made to isolate this substance and to characterize it as a chemical element, but notwithstanding the great activity of the products obtained, the result has not so far been obtained. The theory of radio-active transformation foresees that the quantity of polonium present in

radio-active minerals must be very small. According to this theory, polonium is considered as a descendant of radium, and the relative proportion of these substances in the state of radio-active equilibrium is equal to the ratio of their mean lives. The mean life of radium being about 5300 times greater than that of polonium, and radium being found in pitchblende in the proportion of about 0.2 Gm. per ton, it is evident that the same mineral cannot contain more than about 0.04 Mgm. of polonium per ton. Polonium is an unstable element which appears to represent the last radio-active terms in the series of radio-active derivatives. Giving rise to emission of α -rays, it should produce helium, but this production has not been observed up to the present, and it is important to know if there is really in this a fact incompatible with theory. To throw further light upon this the authors have undertaken a chemical investigation with a view to preparing polonium in a very concentrated state, using several tons of uranium residues for the purpose, and by methods indicated in their present communication they have succeeded in obtaining about 2 Mgms. of a highly concentrated material. The activity of this was measured by the electric method, and by calculation they proved that the quantity of polonium would amount to about 0.1 Mgm. and this amount is what should be found, according to theory, in about two tons of pitchblende. But the significant outcome of the present investigation is that the authors have demonstrated that helium is actually produced from a solution of polonium introduced into a quartz tube placed into an apparatus which could be freed from air completely. Much gas was disengaged, which was almost completely absorbed by the action of heated copper and copper oxide, potassium hydroxide, and phosphoric anhydride, leaving finally a residue of helium in a comparatively pure state, whose complete spectrum was observed and its volume measured. This volume is almost that required by theory.—Pharm. Journ. and Pharmacist, March 5, 1910, 292; from Compt. rend.

Radium Emanation—Conditions Facilitating its Liberation.—H. Herchfinkel finds that the liberation of radium emanation can be greatly facilitated by diluting the radium with the rare earths, which set free the emanations of thorium and actinium. Using the hydrates of didymium, iron, uranium, thorium, aluminum, barium, the fluorides and oxalates of barium and didymium, chromates of barium and iron, sulphates of barium and lead, and determining the emanation set free, the author has shown that the hydrates of iron and aluminum carry down nearly all the radium, while the other hydrates only carry down very little. All the hydrates set free a fairly large proportion of emanation in the dry state. The amount liberated by salts of barium is very small, and does not usually depend on the nature of the radical. Didymium fluoride and iron chromate set free a large proportion, didymium oxalate less, and lead sulphate still less.—Chem. News, Oct. 8, 1909, 184; from Compt. rend, 149 (1909), No. 4.

Radium Emanation—Action upon the Elements of the Carbon Group.

In continuation of previous studies dealing with the action of radium emanation on the elements of the carbon group, Sir William Ramsay and Francis L. Usher give a description of the methods employed in the experiments by which they have obtained the results described at the time. From the figures given it is shown that the elements of the carbon group, without exception, give carbon compounds when the emanation acts upon them; the amounts produced, however, are not all the same. It is not improbable that those elements which have a high atomic weight are generally more easily split up than those with lower atomic weights, but it must be supposed that lead is specially stable, and shows but little tendency to change into carbon.—Chem. News, Oct. 29, 1909, 209; from *Berichte* 42, 2930.

Radio-Active Substances—Comparison of the α -Rays Produced by Different Substances.

Mlle. Blanquies observes that it is generally supposed that the α -particles emitted by different substances only differ in the velocity of their projection. If this is so, all α -particles ought to have the same properties if they are studied when at the same distance from the end of their path. In order to verify this the author has determined the shape of the ionisation curve in which the ionisation is expressed as a function of the distance: if the hypothesis is correct all the curves constructed on the same scale should be superposable. Using polonium, radium C, and actinium B the author finds that the curves of the two former agree very well, while that of actinium B is different. The difference can be satisfactorily explained by supposing that all α -particles are identical, except as regards velocity of projection, but that the radiation obtained by using as source a plate rendered active by contact with actinium emanation is complex. The experimental investigation of this hypothesis does not perfectly confirm it, but, on the other hand, the curves are not known with absolute certainty, so that complete agreement cannot be expected.—Chem. News, Sept. 24, 1909, 160; from *Compt. rend.*, 148 (1909), No. 26.

Metallic Aluminum—Rapid Method of Determination.

E. Kohn-Abrest finds that when metallic aluminum is heated to about 300° C, first in a current of hydrogen and then in a current of hydrochloric acid gas, a residue is left consisting of aluminum oxide, iron, chlorine, and different impurities, while a sublimate of aluminum chloride is obtained, containing very small proportions of iron perchloride and traces of ammonium chloride due to the decomposition of ammonium nitrate by the hydrochloric acid. Any silicon is volatilized and carried away by the current of gas in the form of silicochloroform. If the chlorine is determined in the aluminum chloride the amount of metallic aluminum is obtained directly. Special precautions have to be taken in the condensation of the vapors and their solution in water. This method enables very rapid determina-

tions to be made of metallic aluminum and the oxide. By also estimating the silicon and the iron a complete analysis of the commercial metal can be made.—Chem. News, Oct. 22, 1909, 207; from Compt. rend., 149 (1909), No. 6.

Aluminum Nitride—New Process of Preparation.—According to A. J. Sofianopoulos, aluminum nitride (Al_2N_3) may be obtained by the following new process: A stream of pure dry ammonia is passed over powdered aluminum at a red heat until the gas ceases to be absorbed and hydrogen is no longer produced. The nitride produced in this way is an amorphous, spongy product of a grey color, absolutely pure when prepared from pure products. If it should be mixed with a small quantity of metallic aluminum, it may be purified by reducing it to a very fine powder and treating it with heated mercury, which forms an amalgam with the aluminum without in any way affecting the nitride. The nitride is then easily separated by washing with cold water and decanting. It is quite stable in the dry state, and is not attacked by oxygen, even when heated in an atmosphere of that gas. It is easily decomposed however, by the halogens, with production of nitrogen and the corresponding salts of aluminum. Acids decompose it in the cold. At ordinary temperatures it is decomposed by water slowly, more quickly at 60°C. , and very rapidly at boiling temperatures, the products being ammonia and aluminum hydroxide. With caustic alkalies, especially on boiling, there is abundant production of ammonia and the formation of the corresponding aluminate.—Pharm. Journ and Pharmacist, July 31, 1909, 134; from Bull. Soc. Chim., 1909, 614.

Exsiccated Alum—Moisture Absorbed on Exposure.—Willard Graham records the results of experiments made to ascertain the amount of water that may be absorbed by dried alum on exposure to air, and gives figures which show that under circumstances this may amount to as much as 45 per cent.—thus exceeding the amount lost by ordinary powdered alum when dried for 8 hours at 160°C. , which was only between 39 and 40 per cent. If kept in well-stoppered bottles, the amount of water absorbed will (of course) be much less than when exposed to the air, but even under the best conditions, exsiccated alum will absorb considerable moisture. The author is of the opinion that the Pharmacopœia (which requires exsiccated alum to contain 99 per cent. of anhydrous salt) should allow the presence of from 5 to 10 per cent. of water.—Proc. Penna. Pharm. Assoc. 1909, 182–184.

Sodium Alum—Preparation and Properties.—W. R. Smith says that the existence of sodium alum, $\text{Na}_2\text{SO}_4\text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$, has been denied by Ostwald among others. He finds, however, that whenever approximately equivalent amounts of sodium and aluminum sulphates are dissolved in water and made to crystallize at ordinary temperatures, octahedral crys-

tals are obtained which correspond in composition with the theoretical sodium alum. The best method of manufacturing this compound is to dissolve the materials in an amount of water sufficient to give a solution moderately supersaturated at ordinary temperatures, and then cool the solution and induce crystallization by stirring or seeding. Small crystals will be obtained similar to "alum meal." If larger crystals are desired, they can be made by slow evaporation at ordinary temperatures. That this substance is a definite chemical species is proved by the fact that the composition does not vary when crystallized from solutions of varying composition. The reason why the existence of sodium alum has been questioned probably lies in the fact that it is not formed at temperatures much above 30° C.—Pharm. Journ. and Pharmacist, Sept. 4, 1909, 319; from Journ. Amer. Chem. Soc., 1909, 245.

ZINC.

Zinc—New Reaction.—Angel del Lampo Cerdan finds that if ammonia is added to the solution of a zinc salt, until the precipitate formed is redissolved, the addition of an alcoholic or ethereal solution of resorcinol develops a handsome blue color, which manifests itself quicker or slower according to the quantity of zinc salt present. The reaction is available for dilution of 0.01 Zn in 1000 Cc. of water, but is interfered with by the presence of cobalt, nickel, copper and magnesium.—Pharm. Ztg., lv (1910), No. 12, 118; from Rép. de Pharm., 1910, No. 1.

Zinc Peroxide—Variable Quality in French Commerce.—P. Lemaire observes that zinc peroxide, which is considerably prescribed in Continental medical practice, is very variable in French commerce. Of fifteen samples examined, the worst contained only 11.15 per cent. of ZnO₂, and the best but 40.9 per cent., only two other samples giving more than 40 per cent. While the author did not come across a sample which contained no available oxygen, he mentions that Vauverts has met with some samples which were simply ordinary zinc oxide. The peroxide is tested by dissolving 20 Cgm. of the sample in 10 Cc. of 10 per cent. sulphuric acid and titrating the solution with $\frac{N}{10}$ permanganate, each Cc. of which is equivalent to 2.45 per cent. of ZnO₂ in the sample.—Pharm. Journ. and Pharmacist, April 2, 1910, 429; from Rép. de Pharm., 22 (1910), 1.

CADMIUM.

Cadmium—Insecticidal Properties of its Solutions.—H. C. Dunning directs attention to the value of a solution of cadmium nitrate as an insecticide. The solution was made by dissolving 5 parts of cadmium metal in 15 parts of C. P. nitric acid and 80 parts of filtered water, and this was used as a spraying insecticide by further dilution with 20 parts more of water. His experience demonstrates that it rapidly kills red ants, roaches, army worms and potato bugs, when sprayed with this solution. In fact,

"it seems to be death to every species of animal life from the smallest bacteria to rats." Mr. Dunning also attributes pronounced therapeutic value to this solution, particularly as a germicide in the treatment of tuberculosis. He has found that when freshly made and the vapor (spray?) of the solution was inhaled for one minute, a cold in the head was cured within one hour.—Proc. Penna. Pharm. Assoc., 1909, 240-242.

CHROMIUM.

Chromyl Sub-Chloride—Formation and Properties.—According to T. Pascal, nitric oxide acts on chromyl chloride to give a sub-chloride of chromyl, $5\text{CrO}_2\text{Cl}_2 + 4\text{NO} \rightarrow (\text{CrO}_2)_3\text{Cl}_6 + 4\text{NOCl}$. This compound forms crystals which have magnetic properties. They deliquesce in damp air, and dissolve readily in water, giving chromic acid, hydrochloric acid, and salts of chromium. At a high temperature they decompose according to the equation $3(\text{CrO}_2)_3\text{Cl}_6 = 5(\text{CrO}_2)_3\text{Cl}_2 + 8\text{Cl}$, while, when gently heated, the reaction which occurs is $(\text{CrO}_2)_3\text{Cl}_6 = (\text{CrO}_2)_2\text{Cl}_4 + 2\text{CrO}_2\text{Cl}_2$. It may be said that at a relatively low temperature the subchloride's reactions are due to its chlorine, and at a high temperature to both its oxygen and chlorine.—Chem. News, July 16, 1909, 36; from Compt. rend., 148 (1909), No. 22.

MANGANESE.

Permanganate of Potassium—Danger of Intravenous Injection in Snake Bite.—Sir Lauder Brunton's experiments, and other experiments made at Bombay and Calcutta, confirm the results obtained by Sir Joseph Frayrer over 30 years ago, that intravenous injection of potassium permanganate in the treatment of snake bite are both useless and dangerous. But these tests have nothing to do with the local application of the salt, by incision and direct application of the permanganate at the seat of the injection of the venom—a number of successful applications, as well as a few unsuccessful ones having been recorded.—Pharm. Journ. and Pharmacist, June 18, 1910, 758.

TUNGSTEN.

Phospho-tungstic Acid—A Sensitive Reagent for Ferrous Salts.—A. Richaud and Bidot recommend phosphotungstic acid as a sensitive reagent for ferrous salts. The reagent is prepared by dividing 25 Gm. of sodium phosphotungstate in 250 Gm. of water and adding 5 Gm. of hydrochloric acid. If some of this reagent and a little NaOH solution are added to solutions containing mere traces of a ferrous salt, a blue color results, and disappears again on acidulating the mixture. This reagent is particularly recommended for the detection of traces of iron in urine.—Pharm. Ztg. iv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

Uranyl Chloride—Preparation and Properties.—Echsner de Coninck states that uranyl chloride may be obtained by adding drop by drop a so-

lution of barium chloride to a concentrated freshly prepared aqueous solution of uranic sulphate: $\text{SO}_4(\text{UO}_2) + \text{BaCl}_2 = \text{BaSO}_4 + \text{UO}_2\text{Cl}_2$. The compound is deliquescent and dissolves in water. When reduced by hydrogen it yields HCl and UO_2 . When heated with a large excess of caustic potash in an open tube a peruranate is formed: $\text{UO}_2\text{Cl}_2 + 2\text{K}_2\text{O} + \text{O} = 2\text{KCl} + \text{UO}_3\text{K}_2$. With barium chloride and ammonia it yields barium uranate: $\text{UO}_2\text{Cl}_2 + \text{BaCl}_2 + 4\text{NH}_3 + 2\text{H}_2\text{O} = 4\text{NH}_4\text{Cl} + \text{UO}_4\text{Ba}$.—Chem. News, Sept. 24, 1909, 160; from Compt. rend., 148 (1909), No. 26.

URANIUM.

Uranium Oxides—Preparation from the Sulphate.—Echsner de Coninck obtained various uranium oxides indirectly from the sulphate as follows: The uranic sulphate was transformed into nitrate by treating a dilute aqueous solution of it with neutral barium nitrate until all the barium sulphate had been precipitated. The liquid was then concentrated and evaporated to dryness, when the light yellow uranic hydrate, $\text{UO}_3 \cdot 2\text{H}_2\text{O}$, was deposited, mixed with a very minute amount of orange-yellow monohydrate, $\text{UO}_3 \cdot \text{H}_2\text{O}$. From a mixture of uranous and uranic sulphates, uranic dihydrate and uranous monohydrate $\text{UO}_3 \cdot \text{H}_2\text{O}$ were obtained. The latter oxidizes spontaneously in air, as shown by the equation $\text{UO}_3 \cdot \text{H}_2\text{O} + \text{O} = \text{UO}_3 \cdot \frac{1}{2}\text{H}_2\text{O}$.—Chem. News, July 16, 1909, 36; from Compt. rend., 148 (1909), No. 22.

IRON.

Iron Group of Metals—Sensitive Microchemical Reactions.—N. Schoorl describes a number of microchemical reactions for metals of the iron group as follows:

Cobalt.—A sensitive reagent may be prepared by mixing equal volumes of saturated solutions of ammonium sulpho-cyanide and mercuric chloride. A trace of this is applied by means of a platinum wire to a drop of the cobalt solution on a micro-slip. After standing a minute or two the deep blue precipitate of mercury-cobalt sulphocyanide forms irregular triangular particles. By this test one millionth part of a milligramme of cobalt may be detected *sub lente*.

Nickel.—Dimethylglyoxime is the most sensitive reagent for nickel in the presence of ammonia. A select precipitate is formed which, under the microscope, appears as very handsome bundles of needles. By this micro-test the presence of nickel (1 in cobalt, 5,000) may be detected.

Iron.—The precipitation of Prussian blue under the microscope affords the most sensitive reaction for iron.

Aluminum.—The formation of characteristic alum crystals on addition of acid potassium sulphate is characteristic of aluminum.

Chromium.—The precipitate of benzidine chromate affords the most sensitive micro-reaction for chromium. A reagent is prepared with benzi-

dine chloride in a very dilute acetic acid. This gives deep violet-blue needles, plates, and very long hair-like crystals in presenec of chromium. —Pharm. Journ. and Pharmacist, Sept. 4, 1909, 319; from Ztschr. Anal. Chem., 48, 209.

Ferrum Reductum—Improved Process of Assay.—Virgil Coblenz and Otto B. May observe that the present "iodine method" of assay for reduced iron, essentially that of the German, Austrian, and Norwegian Pharmacopœias, was considered at the time of the last revision satisfactory in procedure and accurate in results. The experiments were carried out upon samples which were of a very uniform degree of fineness, a condition which contributed to securing uniformity of results. Attention has recently been called by G. Frerichs to the discrepant results obtained by this method to samples of reduced iron found in the foreign market, who attributes these discrepancies to insolubility of iron, due to physical differences; perhaps greater density, and who found a modification of the "sulphate of copper method" of assay to yield more satisfactory results. The authors have experimented with this method, as modified by Frerichs, and also with the methods as modified by Andrews, and give analytical data which confirm the reliability of these methods. They have, however, also experimented with a method in use at the Edgar Thomson Steel Works, suggested for trial by the chief chemist as their "Citric Acid Method," and find this to give admirable results, while the method appears to be free from some of the objectionable features of the "copper methods." It is carried out as follows: "Place 170 Cc. of nearly saturated solution of double chloride of copper and potassium and 5 Gm. of citric acid in an Erlenmeyer flask. Add 3 Gm. of the sample and shake until dissolved, keeping the temperature below 60° F. Filter residue on 11 Cm. paper, and wash with cold water and a little citric acid until free from copper. Wash well with hot water, ignite, and weigh as iron oxide." This residue consists of iron oxides as well as silica. In two experiments recorded the residues from the same sample amounted to 2.38 and 2.31 per cent. respectively, indicating 97.62 and 97.69 per cent.—the gravimetric CuSO_4 method having given 97.62 and 97.92 per cent. respectively. —Merck's Rep., July, 1909, 165-167.

Ferrites and Iron Oxides—Magnetic Properties.—From an exhaustive study of the magnetic properties of ferrites and iron oxides, Siegfried Hilpert concludes that in the series of the ferromagnetic iron oxide compounds the chemical causes of the appearance of magnetic properties depends only on the acid function of the iron oxide. Conversely, however, the acid character of the iron oxide does not in all cases produce ferromagnetic properties. Feebly magnetic ferrites must be heated to high temperature before they exhibit magnetic properties. In the case of all the ferrites investigated it was possible to produce a magnetic modifica-

tion. Moreover, all ferrites have the property which is common to the ferromagnetic metals of possessing transition temperatures above which the magnetic properties entirely disappear. These changes are generally reversible. The change of black ferroso-ferric oxide into red iron oxide occurs without appreciable change in the magnetic properties, and apparently in this case there is no connection between the absorption of light and also the electrical conductivity and the magnetic properties. Chem. News, Aug. 27, 1909; from Rev. d. Chem. Ges., 242 (1909), No. 10.

Calcium Ferrites—Formation and Properties.—Siegfried Hilpert and Ernst Kohlmeier state that when iron oxide prepared from oxalate and pure calcium oxide are fused together, and the melting-point curve of the mixture is examined, it is found that the melt with 95 per cent. of lime contains the latter in the form of crystals, which decrease in amount as the proportion of iron increases, until they disappear at 75 per cent. of lime. At 1410° calcium orthoferrite $3 \text{CaO} \cdot \text{Fe}_2\text{O}_3$ is formed. When the percentage of lime has been decreased to 60 a maximum corresponding to $3\text{CaO} \cdot 2\text{Fe}_2\text{O}_3$ is observed, and as the proportion of iron is increased a eutectic occurs at 1200° C. corresponding to $\text{CaO} \cdot \text{Fe}_2\text{O}_3$. The color of the melts varies with the amount of lime present, those richest in iron oxide being black and metallic-looking. Their conductivity is small. The calcium ferrites are attacked by water and dilute acids. Chem. News, Febr. 25, 1910, 96; from Ber. d. D. Chem. Ges., 42 (1909), No. 17.

NICKEL.

Nickel and Cobalt—Differentiation as Ferrocyanide.—Franz Felix Werner calls attention to the possible utility in the analytical scheme, of the characteristic reactions of cobalt and nickel with ferrocyanides. Potassium ferrocyanide gives with solutions of cobalt salts, even when dilute, a characteristic dark green precipitate of cobalt ferrocyanide, and in very dilute solutions a distinct green color is perceptible. With nickel salts, an apple-green precipitate is produced under the same conditions and the resulting ferrocyanide is quite stable, and quantitatively correct, whereas the cobalt ferrocyanide is easily oxidized and very unstable. For the present these reactions are available in qualitative analysis: The portion of ammonium sulphide precipitate remaining undissolved by HCl is dissolved in that acid by the aid of a few drops of HNO_3 , in the well known manner, the solution evaporated, the residue dissolved in dilute HCl, and the solution tested with ferrocyanide, which reveals the presence of Co and Ni by the reaction described.—Pharm. Ztg., lv (1910), No. 21, 210.

Nickel and Copper—Their Alloys not Definite Compounds.—Em. Vigouroux reports the results of an experimental inquiry into the constitution of alloys of nickel and copper. The pure metals copper and nickel were intimately mixed and fused, and the masses thus formed were ex-

amined both chemically and physically to ascertain whether compounds had been produced. The substances isolated by chemical reactions contained the two metals in proportions which depended only on the experimental conditions, which argues against the formation of definite compounds. This result is confirmed by the determination of the electromotive force of the alloys.—Chem. News, Febr. 18, 1910, 83; from Compt. rend., 149 (1909), No. 26.

INDIUM.

Indium—Quantitative Determination.—According to A. Thiel and H. Koelsch, indium may be determined quantitatively by precipitating it as hydroxide with ammonia, and heating to 850°C. in an electric furnace. It is then obtained in the form of oxide, In_2O_3 . The precipitate must be heated in a Gooch's crucible. If the oxide is too strongly heated a loss of weight is observed. This is not because it volatilizes as such, but it gives up oxygen, forming a lower oxide which crystallizes in the regular system. Indium hydroxide is appreciably soluble in ammonia, complex compounds being formed. The solubility of freshly precipitated indium hydroxide in strong ammonia can be used to separate indium from iron. When indium hydroxide is washed with pure water colloidal solutions are formed, and also when ammonia and dimethylamine are used to wash it, provided that the salts of the two last named substances are not present in concentrated solution. Hitherto InI_3 has been the only indium iodide known, but the authors have proved the existence of two other iodides, InI , and InI_2 . They have also prepared a monosulphide, InS , di-indium triselenide, In_2Se_3 , and indium monotelluride, InTe . Lower tellurides and selenides appear to exist, as well as a monophosphide, InP .—Chem. News, June 3, 1910, 264; from Ztschr. Anorgan. Chemie, 66 (1910), No. 3.

LEAD.

Lead Chromate—Coloring Power on Textiles.—According to Leo Vignon, precipitated lead chromate dyes silk, wool, and cotton equally well, differing from the soluble dyes—orange II, picric acid, and roceline—as regards the conditions of fixation. To obtain a given shade much more lead chromate than soluble dye is necessary. Moreover, lead chromate is not fixed chemically by textiles, but its fixation is evidently due to molecular attraction.—Chem. News, July 2, 1909, 12; from Compt. rend., 148 (1909), No. 20.

Lead Phosphates—Preparation and Properties.—H. Alders and A. Stähler have studied the properties of primary-, secondary- and tertiary lead phosphates. They find that tertiary lead phosphate, $\text{Pb}_3(\text{PO}_4)_2$, prepared by the action of excess of alkali phosphate on a soluble lead salt always contains alkali which cannot be removed by boiling with water. In order to get the pure tertiary salt, excess of lead acetate must be boiled.

with a little sodium phosphate, or the secondary salt must be boiled for a long time with water, when it is converted into the tertiary phosphate. Secondary lead phosphate, PbHPO_4 , can be very easily prepared by adding hot dilute phosphoric acid (about 25 per cent. H_3PO_4) to boiling dilute lead nitrate solution. It then forms in fine crystals which can be re-crystallized in dilute phosphoric acid. Primary lead phosphate can be prepared by the action of excess of hot strong phosphoric acid on the secondary salt. The limits of stability of the secondary phosphate are the widest. The tertiary phosphate only exists when very little H_3PO_4 is present, and the primary when the H_3PO_4 concentration is very great. The latter changes very readily into the secondary phosphate when small changes of concentration occur.—Chem. News, Aug. 27, 1909, 107; from Ber. d. D. Chem. Ges., 42 (1909), No. 10.

Lead Sulphate—Solubility.—J. Schnal's determination of the solubility of lead sulphates give numbers which differ considerably from those obtained by Fresenius and Rodwell. The purity of the salt is the only factor which can influence the solubility, the presence of a trace of sulphuric acid being sufficient to cause a considerable difference. Solution takes place extremely slowly, and possibly the lead sulphate decomposes according to the equation $\text{PbSO}_4 + 2\text{H}_2\text{O} = \text{PbOH}_2 + \text{H}_2\text{SO}_4$. The hydrated oxide of lead dissolves easily in sulphuric acid. Chem. News, July 9, 1909, 24; from Comp. rend., 148 (1909), No. 21.

Lead and Bismuth—Quantitative Separation.—After trying and abandoning various methods for the separation of lead and bismuth which proved unsatisfactory, J. C. Galetly and G. G. Henderson adopted the following method proposed by Clark (1890), which they modify in some particulars:—A solution of the chlorides of lead and bismuth containing a spiral of steel wire (1 to 2 grammes) was heated until most of the iron was dissolved, and the precipitated bismuth and the remainder of the iron were collected, washed with boiling water until free from lead, and dissolved in hydrochloric acid with the aid of potassium chlorate. After diluting the solution, the bismuth was precipitated as sulphide, the precipitate washed with a solution of hydrogen sulphide until free from iron, dissolved in nitric acid, and after filtration precipitated with ammonium carbonate. The precipitate was washed, ignited, and weighed as Bi_2O_3 . The results obtained were much more satisfactory than those given by any other of the processes tried. The authors consider that Clark's process for the estimation of bismuth in presence of lead is not only easily carried out, but that it is also capable of yielding accurate results. The process, however, can be improved by precipitating the bismuth as phosphate—a method which they have found to give excellent results—instead of with ammonium carbonate as originally described. Pharm. Journ. and Pharmacist, Oct. 2, 1909, 423; from Analyst, Sept. 1909, 389.

TITANIUM.

Titanium—Production of the Pure Metal.—Until Moissan obtained metallic titanium free from nitrogen by reducing titanium dioxide and reheating the product, all attempts had resulted in the production of various nitrides, which from their metallic appearance were mistaken for the metal. M. A. Hunter now describes a method which is admirable for producing the metal in moderately large quantities in a state of purity hitherto unattained. It consists in the reduction of titanium tetrachloride with sodium, the reaction being conducted in a bomb of machine steel, containing 50 Gm. of titanium tetrachloride and 25 Gm. of sodium, and heating to a low red heat. The almost pure metal, outwardly resembling polished steel, is hard and brittle, and cannot be drawn into wire. It melts with difficulty between 1800° and 1850° C.—Journ. Amer. Chem. Soc., March, 1910, 330.

Titanium—New Reaction.—Jean Piccard finds that in reductions with titanium trichloride certain acids act as catalytic agents to accelerate the reaction, and it is found that, in general, monobasic acids have no action, while polybasic acids act as catalyzers. Hence this reaction can be used as a test of the basicity of an acid. It is interesting to notice that hydrofluoric acid is very strongly active, which confirms the assumption of the polymerization of the acid to form H_2F_2 molecules. It is already known that the salts of trivalent titanium give with oxalic acid in aqueous solution a yellow coloration. Pyrocatechin also gives an orange-yellow coloration with titanium trichloride, and this color reaction is much more marked than that with oxalic acid. If the dilution is not too great, a red-brown amorphous precipitate is obtained, forming a black insoluble powder on drying, which appears to be a mixture of several compounds. If the dilution is greater, the formation of the yellow coloration is a very sensitive test for titanium, fifteen times as sensitive as the H_2O_2 reaction. The pyrocatechin must be present in excess, and mineral acids prevent the reaction, while alkalis, alkaline carbonates, or ammonia weaken it.—Chem. News, Jan. 21, 1910, 35; from Ber. d. D. Chem. Ges., 42 (1909), No. 16.

Titanium Chloride—Reduction by Hydrogen.—Hans Georges and Arthur Stähler find that titanium tetrachloride is reduced to the trichloride by hydrogen at temperatures ranging from 785 – 1200° C., the yield of $TiCl_3$ being increased as the temperature is raised, although the reaction is not quantitative even at 1200 C. $TiCl_3$ is a fine reddish violet powder which is rapidly decomposed by damp air. Even at the ordinary temperature it decomposes according to the equation $2TiCl_3 \rightleftharpoons TiCl_4 + TiCl_2$. Solutions of titanium dichloride (divalent titanium) turn violet when heated in air or when treated with nitric acid, the color in the latter case disappearing. With $TiCl_3$ they give a violet coloration, and with ammonia, ammonium carbonate, or ammonium sulphide a brownish black precipitate. The

authors have also found that divalent titanium gives a green solution with potassium rhodanite, green titanous acetate with sodium acetate, and calomel with mercuric chloride. Chem. News, Oct. 29, 1909, 220; from Ber. d. Chem. Ges., 42 (1909), No. 13.

THORIUM.

Thorium Bromide and Chloride—Formation and Kind of Hydrates.—According to Ed. Chauvenet, the normal hydrate of thorium chloride, $\text{ThCl}_4 \cdot 8\text{H}_2\text{O}$, is transformed into $\text{ThCl}_4 \cdot 4\text{H}_2\text{O}$ at 50° , and at the same temperature the hydrate of thorium bromide which contains 12 molecules of water, and which is obtained by evaporating $\text{Th}(\text{OH})_4$ with HBr , yields $\text{ThOHBr}_3 \cdot \text{H}_2\text{O}$. This last compound is analogous to $\text{ThOHCl}_3 \cdot \text{H}_2\text{O}$ which is formed at temperatures above 100°C . only. At 105°C . $\text{ThBr}_4 \cdot 12\text{H}_2\text{O}$ yields ThOBr_2 , and $\text{ThCl}_4 \cdot 8\text{H}_2\text{O}$ yields ThOCl_2 at 250°C . Thus the oxyhalogen derivatives of the bromide are formed at much lower temperatures than the corresponding derivatives of the chlorides. Chem. News, Oct. 8, 1909, 184; from Compt. rend., 149 (1909), No. 4.

Thorium Chlorophosphate—Formation and Composition.—According to A. Colani, a chlorophosphate of thorium of formula $2\text{P}_2\text{O}_5 \cdot 3\text{ThO}_2 \cdot \text{ThCl}_4$, and corresponding to the chlorophosphate of uranium, can be prepared by heating thorium metaphosphate and thorium chloride to a fairly high temperature in an atmosphere of carbon dioxide. Thorium bromide, when treated similarly, gives a bromophosphate of different formula, the analysis of which is very troublesome, and does not lead to satisfactory results. Double phosphates of calcium and strontium also exist, having the same formulæ as the corresponding compounds of uranium.—Chem. News, Oct. 8, 1909, 183; from Compt. rend., 149 (1909), No. 3.

COPPER.

Copper Sulphate—Gravimetric Estimation.—P. B. Dallimore finds the following gravimetric method for estimating copper in the sulphate to be rapid, clean, and reliable, giving perfectly concordant results and comparing favorably with the volumetric estimation—the method depending on the reduction of copper salts to metallic copper. Three Gm. of copper sulphate are gently heated over a water-bath with an excess of hypophosphorous acid diluted with an equal volume of water, the mixture being constantly stirred. In a very few minutes the finely divided copper comes down, and the clear liquid will be found quite free from copper. The liquid is then decanted through a filter, the precipitate transferred to the filter with a jet of water, and carefully washed to remove all traces of acid. It is then washed with alcohol and ether, dried in a current of air a few moments, and transferred at once to a weighed porcelain crucible, in which it is converted to the oxide by heat, and ignited to constant weight. In an actual experiment, 3.085 Gm. of copper sulphate yielded 0.983 Gm. of

cupric oxide, which figures correspond to 99.97 per cent. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.—Pharm. Journ. and Pharmacist, Aug. 21, 1909, 271.

Copper Sulphate — Efficiency as an Algicide.—According to Bulletin 76, Bureau of Plant Industry, U. S. Dept. Agriculture, ponds, pools, tanks, reservoirs, etc., may be freed from algæ by the use of copper sulphate. The necessary amount of copper sulphate is put into a bag of coarse mesh and slowly dragged through the water. By a process of gradual solution, the water will become impregnated with the copper sulphate. In large ponds or reservoirs, this may be carried out by tying the bag of sulphate behind a boat and quietly rowing about; in smaller ponds or canals, the bag fixed to a pole can be dragged through the water by a man walking along the bank. The amount of copper sulphate required to completely destroy fresh-water algæ is very small, but more is required in warm countries than in cool. When a sufficient amount of copper sulphate was used to give a strength of one part in 4,000,000 to 10,000,000, or say 1 lb. of copper sulphate dissolved in 1,000,000 gallons of water, it was found sufficient to destroy nearly all forms of green algæ, and in most instances it does not injure the fish in the ponds.

MERCURY.

Mercury—Detection by Means of Metallic Aluminum.—C. Reichard directs attention to a new method for detecting mercury in solutions, which depends on the formation of a white coating of aluminum oxide on the surface of a bright sheet or wire of aluminum in contact with such a solution. The reaction is quite sensitive, but is directly available only if the mercury is in solution. Sparingly soluble mercury salts must therefore first be transformed into the soluble chloride. Moreover, the aluminum surface must be perfectly bright and free from fat, and the metal should therefore be cleansed with ether, and the mercury solution must be neutralized before attempting the test. The reaction must be allowed to take place perfectly undisturbed, while the observation is best made by allowing it to take place under a bell jar on a black surface.—Pharm. Zentralh., 51 (1910), No. 21, 443-449.

Mercury—Volumetric Method of Estimation in Galenical Preparations.—Referring to Rupp's application of the volumetric method of estimating mercury in galenical preparations, Dr. R. Ginter mentions that the proposed method when applied to ointments prepared with a gelatin base or starch base and containing only small percentages of mercury compound, requires some modification. As an example, he selects such an ointment containing about 0.3 per cent. of corrosive sublimate and conducts the process as follows: 45 Gm. of the ointment (containing about 1.125 Gm. of mercuric chloride) are mixed with 250 Cc. of distilled water in a 750-Cc. stoppered flask, shaken vigorously a few minutes, and after adding 5 Gm. of potassium iodide, again for 10 minutes. Then 50 Cc. of

10 per cent. NaOH solution and 25 Cc. of 40 per cent. formaldehyde solution are added, the mixture is again shaken 10 minutes, acidulated with 12 Cc. of glacial acetic acid, and then 15 Cc. of $\frac{N}{10}$ iodine solution are added. After again shaking 10 minutes, the mixture is titrated with $\frac{N}{10}$ thiosulphate solution, of which 5 Cc. should be required, showing that 10 Cc. of the iodine solution has been consumed. Accurate values are thus readily obtained. Pharm. Ztg., LV (1910), No. 42, 428.

Mercury—Convenient and Accurate Method of Determination in Ointments.—L. Willen regards the ordinary methods for the determination of the mercury in ointments, for example in the yellow oxide of mercury ointment, either to be inaccurate or when accurate to be too complicated, and suggests the following as being both convenient and accurate: A quantity of ointment containing about 0.1 Gm. HgO is carefully warmed in a 100-Cc. flask with 10.0 Cc. of benzin until it is dissolved; 15 Cc. of $\frac{N}{10}$ iodine solution is then added, the flask well stoppered, and the warming of flask and contents continued for a short time to complete the reaction. The excess of iodine is then titrated with $\frac{N}{10}$ sodium thiosulphate without the use of an indicator. By multiplying the number of Cc. of iodine solution consumed by 0.108, the HgO content of the ointment is ascertained.—Schweiz. Wschr. f. Chem. u. Pharm., xlviii (1910), No. 16, 250.

Mercuric Salts—Determination with Diphenylcarbazide.—Oddo finds that diphenylcarbazide yields with mercurous salts a mercurodiphenylcarbazone having a characteristic blue color which is not discharged by nitric acid, and applies the reaction practically as follows: The solution of mercurous salt—for example mercurous nitrate—is treated with $\frac{N}{10}$ sodium chloride solution until all the mercury salt is precipitated as mercurous chloride. The end of the reaction is recognized when diphenylcarbazide no longer produces a blue color—this reagent being applied in the form of filter-paper saturated with an acetic-acid solution of the carbazide, which is touched from time to time with the end of a glass rod dipped into the solution under examination after the precipitate of mercurous chloride has subsided.—Pharm. Ztg., lv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

Mercurous Iodide—Preparation of an Impalpable Salt for Ointment.—Dr. v. Ammon gives explicit directions for preparing mercurous iodide in a minutely divided condition, in connection with a formula for a 1 per cent. ointment, as follows: 2.1 Gm. of mercurous nitrate are dissolved in 500 Cc. of cold distilled water, with careful trituration and continuous addition of the solvent. The solution is filtered and carefully and equably, poured into a solution of 1.32 Gm. potassium iodide in 250 Cc. of distilled water, heated to 50° C., and contained in a 1000-Cc. glass cylinder. A greenish turbidity manifests itself at first, changing gradually to yellowish.

The cylinder is then stoppered, and inverted several times, until the mercurous iodide settles to the bottom in form of an extremely fine light yellow coagulum, and finally precipitates completely. This precipitate, after careful washing with distilled water by decantation until the washings no longer give a blue color with diphenylamine and sulphuric acid, or a black color with KOH or NaOH solution, is reduced by further decantation until the residual magma, containing 2.5 Gm. of mercurous iodide, weighs exactly 13 Gm. In this form it is used for making a 1 per cent. ointment, "Ungt. hydrarg. jodatum puliforme," which see under "Pharmacy." In a precisely analogous manner an impalpable form of

Mercuric Iodide (Hydrarg. bijodatum puliforme) is prepared, using 1.2 Gm. of mercuric chloride; 300 Cc. dist. water and 1.5 Gm. of potassium iodide; 400 Cc. dist. water, and the magma (containing 2 Gm. mercuric iodide) is converted into ointment in the same way as the preceding.—Pharm. Ztg., lv (1910), No. 19, 191; from Münch. Med. Wschr., 1910, No. 9.

Mercuric Chloride—Preparation by the Humid Method.—Prof. E. Rupp and W. Klee find it practicable to prepare corrosive sublimate by the humid method, which can be carried out economically as follows; 100 p. mercuric sulphate and 40 p. sodium chloride are finely powdered and converted into a magma with 20 p. of 5 per cent. hydrochloric acid. After standing 24 hours with frequent stirring, the mixture is triturated and then extracted with boiling 95 per cent. alcohol. If this extraction is done with the aid of a reflux condenser, keeping the liquid boiling, the corrosive sublimate formed is completely extracted with the use of a minimum quantity of alcohol within 1 to 1½ hours. On distilling off the alcohol and recrystallizing the residue from boiling water, the mercuric chloride is obtained in form of dazzling white needles, amounting to 90 per cent., perfectly free from sulphuric acid and conforming to the requirements of the G. P. Instead of mercuric sulphate, the nitrate may be used in same way but is more expensive.—Apoth. Ztg., xxv (1910), No. 26, 219.

Corrosive Sublimate—Volumetric Estimation.—Prof. E. Rupp recommends the volumetric estimation of corrosive sublimate by a method based upon the conversion of mercuric chloride into cyanide, which results quantitatively by reacting with alkali cyanides in excess. The reaction occurs according to the equation: $\text{HgCl}_2 + 2 \text{KCN} = \text{Hg}(\text{CN})_2 + 2 \text{KCl}$. By using a known excess of cyanide, this excess may be ascertained by titration with hydrochloric acid, using methyl orange, which is not affected by hydrocyanic acid, as indicator—this reaction being explained by the following equation: $\text{KCN} + \text{HCl} = \text{KCl} + \text{HCN}$. The author gives the details of the method, as applied to the assay of corrosive sublimate pastilles for which it is particularly adapted.—Apoth. Ztg., xxiv (1909), No. 100, 939.

Dimercury Ammonium Bromide—Formation and Properties.—H. Gaudechon states that when a hot solution of HgBr_2 is added to a cold solution of ammonia a white precipitate of $\text{NHg}_2\text{Br}_3\text{NH}_4\text{Br}$ or a yellow precipitate of $\text{NHg}_2\text{Br}\cdot\text{NH}_4\text{Br}$ is obtained according to the concentration. When either of these is washed with water, $\text{NHg}_2\text{Br}\cdot\text{H}_2\text{O}$ is obtained. If, however, the ammonia solution is added to the hot HgBr_2 solution, a precipitate is formed, which on washing does not give $\text{NHg}_2\text{Br}\cdot\text{H}_2\text{O}$. This precipitate appears to be a compound $(\text{NHg}_2\text{Br})_4\cdot\text{HgBr}$, analogous to $(\text{NHg}_2\text{Cl})_4\cdot\text{HgCl}$. From this NHg_2Br is obtained by treatment with ammonia. It is a yellow crystalline substance which explodes when rapidly raised to a red heat. When slowly heated it decomposes into mercurous bromide and mercury. It very slowly absorbs water from damp air, $\text{NHg}_2\text{Br}\cdot\text{H}_2\text{O}$ being formed. The reverse reaction, *i. e.*, the conversion of the hydrate into the anhydrous salt, has not yet been performed.—Chem. News, Sept. 24, 1909, 160; from Compt. rend., 148, (1909), No. 26.

ARSENIC.

Arsenic Trioxide—Electrolytic Method of Detection in Arsenic Acid.—Having determined that arsenic acid is absolutely non-reducible in alkaline solution and therefore incapable of yielding hydrogen arsenide on hydrolysis, E. Covelli applies this fact to the electrolytic detection of arsenic trioxide in arsenic acid, as follows: 30 Cc. of the liquid under examination, to which KOH in excess has been added, are introduced into a U-tube into the limbs of which two platinum foils are inserted and united with the poles of a Grove-element. If a slip of silver nitrate paper then is suspended in the cathode limb of the U-tube, it will be browned in the course of a few minutes if As_2O_3 is present in the liquid. In the presence of 0.01 Mgm. of As_2O_3 a metallic film is produced within ten minutes; but as little as 0.001 Mgm. produces distinct browning of the silver paper within one hour.—Pharm. Ztg., liv (1909), No. 97, 957.

New Double Arsenates—Preparation.—L. J. Curtman finds that if to a hot ferric chloride solution, strongly acidified with hydrochloric acid, diammonium arsenate solution be added to incipient precipitation, and the mixture heated, there forms a white, finely divided precipitate, of the formula $\text{NH}_4\text{H}_2\text{AsO}_4\cdot\text{FeAsO}_4$. Like the corresponding phosphate, it readily hydrolyzes when washed with water. It readily dissolves in mineral acids, but is practically insoluble in 50 per cent. acetic acid. Ammonia dissolves it on heating, to a deep reddish-brown solution, from which 95 per cent. alcohol precipitates a basic double ammonium ferric arsenate. When potassium arsenate is used under the same conditions, a precipitate is obtained which appears to be the corresponding double alkali arsenate.—Journ. Amer. Chem. Soc., May, 1910, 626.

ANTIMONY.

Antimony—Origin of the Name.—Schelenz says that the plausible and generally accepted derivation of the word antimony, from “antimoine,” based on the supposed unfortunate experience of mediæval ecclesiastics, is now stated to be incorrect. The true derivation is said to be the Arabic word “Ahlmoud,” introduced into Europe by Constantinus Africanus. This became Latinized to “Althimodium,” then to “Athimodium,” and finally to “Antimonium.” Pharm. Journ. and Pharmacist, March 5, 1810, 293; from La Nature, through Journ. de Pharm. et Chim. (Append), 1910, I, 12.

Antimonium Sulphuratum—Composition and Impurities.—F. H. Alcock observes that while antimonium sulphuratum is not much used in medicine and pharmacy, it has a very large importance commercially, since it plays an important part in the rubber industry in which many tons are used annually. It is a difficult matter to get exactly what the vulcanizer requires, and for this reason it is important that more information should be available concerning this substance than is at present found in the pharmaceutical literature. The author therefore offers some practical suggestions concerning the assay of the commercial article. The substance contains sulphur in several forms, and the manufacturer wants to know what these are and their quantities. Sulphur may be present (and often is) as sulphuric acid, calcium sulphate, free sulphur (colloidal and otherwise), and as the normal trivalent sulphide and the pentavalent sulphide, and these in variable quantities. Moreover, the author has found amongst numerous other extraneous compounds calcium phosphate, and others have noticed as common admixtures sodium salts and the like. He has frequently observed a black residue when antimonium sulphuratum is treated with warm solution of alkali hydroxide, which often was found to be iron sulphide, while traces of silica in the form of sand are sometimes also revealed at this stage. Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 297-299.

Antimonium Sulphuratum and Golden Sulphides of Antimony—Rapid Method of Assay.—David Lloyd Howard and J. P. B. Harrison have devised and describe the details of a method of assay for antimonium sulphuratum which is rapid, is applicable to the sulphide preparations in general, and has the further advantage that both the antimony and sulphur can be determined in the same quantity of substance. Briefly, the sulphide is fused with sodium peroxide, thus converting the antimony into sodium metantimonate. This is brought into solution, reduced to the lower state of oxidation, and determined volumetrically by means of standard iodine solution. The sulphur thus oxidized to sulphuric acid is determined by precipitation as barium sulphate. It is stated that the antimony figure should never be less than 30 per cent., and is the only

trustworthy basis in forming an opinion as to the genuineness of manufactured sulphide preparations, also that the combined antimony and sulphur contents should form at least 95 per cent. of the whole product. Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 299-302.

BISMUTH.

Bismuth Subnitrate—Hydrolysis.—H. A. B. Dunning observes that while it may be generally known that bismuth subnitrate mixtures with water become acid, due to the formation of nitric acid, the reaction is usually disregarded as harmless from the therapeutic standpoint and only taken note of when dispensing the salt in aqueous mixture with carbonates. A recent complaint regarding the unpleasant acidity acquired in the course of a few weeks by a mixture of this salt, in rather large proportion, with peppermint water, prompted the author to undertake a number of experiments to determine the conditions of its hydrolyzation, and how it may be prevented or retarded. He finds that pure distilled water is more effective than peppermint water, and that hydrolysis is rapidly increased in proportion to the temperature applied to the mixture; that some forms of bismuth subnitrate are hydrolyzed more easily than others, being much more rapid in the compact form than in the "bulky" kinds; and that the hydrolysis of bismuth subnitrate may be retarded or prevented by the addition of alcohol, glycerin, volatile oils (as, for example, peppermint water and paregoric) within certain limitations as to temperature, while the presence of sodium bromide, and to a less degree sodium chloride, accelerate hydrolysis. Sterilization and aseptic condition do not retard the action. Further experiments are under way, but require some time before they can be communicated as corroborative evidence. The author, however, expresses the opinion that, from a pharmaceutical standpoint at least, the hydrated oxide or the subcarbonate would be the preferable compound for use in prescription dispensing.—Drugg. Circ., July, 1909, 331-332.

Bismuth Subnitrate—Determination of the Acid Radical in Commercial Samples.—Finding the methods of F. A. U. Smith and E. J. Brown unreliable, J. B. P. Harrison advocates the use of the nitrometer method for estimating N_2O_5 in bismuth subnitrate, which he applies as follows: About 2 grams of bismuth subnitrate is mixed with 20 Cc. of water and 10 Cc. of normal soda solution. The whole is brought to the boiling point with stirring, and allowed to digest for about a quarter of an hour on a water-bath, until the bismuth oxide formed has assumed a uniform lemon-yellow color, showing that the process of decomposition is complete. The supernatant liquid having been poured through a filter, the oxide of bismuth is washed with hot water two or three times by decantation, finally on the filter, and the cooled filtrate made up to 100 Cc. To 25 Cc. of the solution thus obtained is added 0.5 Cc. in excess of the quantity of normal sulphuric acid required for neutralization, using methyl orange as indicator.

This is then carefully evaporated to about 2 or 3 Cc., whereby the carbonic acid is driven off, allowed to cool, and finally decomposed in the nitrometer in the usual way. The results of the examination of seven samples of commercial bismuth subnitrate, of different makes, are exhibited in the following table :

Sample.		Bi_2O_3 by Ignition.	N_2O_5 Nitrometer.	H_2O by Difference.	Density.
English.....	A1	80.3	15.47	4.23	1.533
	A2	80.5	15.47	4.03	1.502
	B1	80.2	15.52	4.28	1.886
	B2	79.8	15.66	4.54	1.382
	C1	79.7	15.81	4.49	2.86
	C2	80.0	15.52	4.48	1.826
	D1	78.8	15.43	5.77	2.276
	D2	79.8	15.62	4.58	1.836
	E	80.0	15.57	4.43	1.634
French.....	F	80.0	15.52	4.48	1.798
German.....	G	80.0	15.72	4.28	1.570

The author reviews the various constitutional formulæ for the commercial subnitrate that have been suggested by different authorities, and claims that the N_2O_5 content is practically constant, amounting to about 15.5 per cent., which is considerably lower than results hitherto published. By calculating the proportion $x : y : z$ in the general formula $x\text{Bi}_2\text{O}_3, y\text{N}_2\text{O}_5, z\text{H}_2\text{O}$ on the results recorded above, it is shown that the simplest constitutional formula for bismuth subnitrate of commerce is represented by $6\text{Bi}_2\text{O}_3, 5\text{N}_2\text{O}_5, 8\frac{1}{2}\text{H}_2\text{O}$, corresponding to the composition Bi_2O_3 80.1 per cent., N_2O_5 15.5 per cent., and H_2O 4.4 per cent.—Chem. & Drugg., April 9, 1910, 46; from "The Analyst," March 1910.

VANADIUM.

Ortho-Pervanadates—Preparation and Properties.—According to P. Melikoff and E. Jelchchaninoff, the ammonium salt of pervanadic acid, $(\text{NH}_4)_3\text{VO}_6 + 2\frac{1}{2}\text{H}_2\text{O}$, can be prepared by dissolving ammonium vanadate in concentrated ammonia solution, adding hydrogen peroxide to the cooled solution, and then treating the blue liquid thus obtained with alcohol. An ammoniacal solution of this salt, when treated with a large excess of H_2O_2 , yields a substance which is not a single compound but contains a salt richer in oxygen. The potassium salt of pervanadic acid, $\text{K}_3\text{VO}_6 + 2\frac{1}{2}\text{H}_2\text{O}$, can be prepared similarly, starting with the potassium salt of metavanadium or pyropervanadium acid. These results show that while the salts of *orthopertantallic acid* are formed in dilute solution and in presence of a slight excess of hydrogen peroxide and alkali, the analogous compounds of pervanadic acid are obtained only from concentrated solu-

tions, and with a large excess of H_2O_2 and alkali.—Chem. News, Aug. 57, 1909, 108; from Ber. d. D. Chem. Ges., 42 (1909), No. 10.

SILVER.

Colloidal Silver—Instability.—H. J. Hamburger finds that while freshly made collargol preparations are always readily and completely soluble in water, forming light-brown solutions, they become partially or completely insoluble in the course of a few months. If solutions of such changed preparations are administered hypodermically, they are in his opinion liable to produce dangerous embolia. The author, therefore, advises that only fresh preparations of colloidal silver be employed therapeutically, and that even with these their solutions should be centrifuged before they are injected.—Pharm. Ztg., lv (1910), No. 19, 190; from Pharm. Weekl., 1909, 1263–1290.

Argentamine—Use as a Substitute for Silver Nitrate in Microscopy.—According to H. Kato, argentamine may be used as a substitute for silver nitrate usually employed in microscopic colorations. The reagent is prepared by dissolving 8.0–10.0 Gm. of argentamine in 30.0 Gm. of 1 per cent. potassium dichromate solution and 100.0 Gm. of distilled water. The object to be colored, after fixation in 10–15 per cent. formol solution, is immersed in this reagent until it is of the desired brown color, then washed with water, and immersed in a solution of 1 Gm. hydroquinone in 10 Gm. formol and 100 Gm. water. The object is then dehydrated in alcohol and embedded in paraffin in the usual manner.—Pharm. Ztg., lv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

PLATINUM.

Platinum—Atomic Weight.—E. H. Archibald observes that the platinum salts used by earlier investigators for the determination of the atomic weight of platinum must have contained appreciable amounts of impurities, for the results obtained show considerable differences. By precipitating platinum as ammonium chloroplatinate very pure platinum metal can be obtained. It can be converted into salts of bromo- or chloroplatinic acid without using nitric acid, provided that care is taken to prevent the presence of impurities arising from the utensils employed. In order to remove absorbed water the potassium salts of chloro- and bromoplatinic acids and the corresponding ammonium salts must be heated to 400° C. and 175° C. respectively. Practically the same results are obtained whether the platinum is heated in hydrogen, and cooled and weighed at atmospheric pressure, or whether these operations are carried out *in vacuo*. The analyses of specimens of platinum salts from different sources, and after different purification processes, leads to the same atomic weight; if the values given by the International Commission for the other atomic weights are taken, the atomic weight of platinum cannot differ much from

195.23.—Chem. News, May 13, 1910, 227 ; from Ztschr. Anorgan. Chem. 66 (1910), No. 2.

Platinum Black—Method of Preparation.—F. A. McDermott recommends the following method of preparing platinum black: An aqueous solution of chloroplatinic acid, containing 0.5 Gm. of PtCl_4 in 10 Cc., is precipitated by an excess of commercial sheet aluminum. The action is very rapid, and generates a great deal of heat. Sufficient strong hydrochloric acid is then added to dissolve any excess of aluminum. When the action is over, the solution presents the uniform black appearance of a strong colloidal solution of platinum, and at the surface of the liquid a platinum mirror is often precipitated on the walls of the container. In this condition the platinum black will take a long time to settle out, but if the liquid is heated on a steam bath, the black will settle in minute flakes within a couple of hours. The supernatant liquid is usually yellow or greenish, probably from the presence of iron in the aluminum. This liquid is removed by decantation, and the black twice heated for one hour at 100°C. with fresh quantities of strong hydrochloric acid, which will remove practically all remaining metallic impurities. It is then washed with distilled water by decantation until the wash-water gives no test for chlorine with silver nitrate, washed into a small beaker with distilled water, allowed to settle, the excess of water removed by decantation or with a pipette, and the black dried in a vacuum over sulphuric acid, to avoid heating. The platinum black thus obtained is of a uniform dull black color, and between the fingers reduces to an absolutely impalpable powder. It appears to have a very considerable catalytic power. It contains 96.5 per cent. of metallic platinum. While the platinum black prepared by means of zinc becomes the gray "spongy" platinum when heated to redness, that precipitated by aluminum changes but slightly in color, although it becomes somewhat more coherent.—Pharm. Journ. and Pharmacist, April 9, 1910, 455 ; from Journ. Amer. Chem. Soc., xxxii, No. 3, 336.

Trivalent Platinum—Oxidation.—When finely powdered platinum tetrachloride is heated to 390°C. in pure chlorine a residue of PtCl_4 is left ; but Lothar Wöhler and F. Martin find that a more convenient method of preparing it is to heat the lower chloride PtCl_2 to $390^\circ\text{--}400^\circ \text{C.}$ in chlorine for about five hours. The sesquichloride is a black or greenish powder which is intermediate between the higher and lower chlorides as regards solubility in water. With boiling water it gives an acid solution, in which the presence of $\text{H}_2\text{PtCl}_5\text{O}$ may be assumed. The sesquichloride is almost insoluble in concentrated hydrochloric acid at the temperature of the room, but dissolves on warming, and cannot be obtained again on evaporating off the hydrochloric acid. Pt_2O_3 is obtained when platinum sesquichloride is treated with boiling soda solution or with strong caustic potash. It is a brown substance which is stable towards oxygen. It ap-

pears to be capable of existence only in the form of a solid solution in excess of PtO . In the hydrated state it occupies a middle position as regards properties between the dioxide and the lower oxide.—Chem. News, Dec. 17, 1909, 303; from Ber. d. D. Chem. Ges., 42 (1909), No. 14.

Platinum Trioxide—Preparation and Properties.—L. Woehler and F. Martin give the following method for preparing platinum trioxide: Freshly precipitated white hydrated platinum dioxide is prepared by boiling an alkaline solution of a dioxy salt and adding the solution to acetic acid. After thorough washing this is redissolved in semi-normal potassium hydroxide solution, and the yellow liquid is submitted to anodic oxidation at a low temperature. Silky leaflets of an acid potassium platinate $3\text{PtO}_3 \cdot \text{K}_2\text{O}$ are thus obtained, floating in the liquid. On suspending these in ice-cold semi-normal acetic acid the trioxide, PtO_3 , is obtained in reddish-brown tinsel-like particles which may be purified by washing. It is a very unstable body, as evidenced by the continuous evolution of oxygen from the suspension. It is not affected by dilute acids, except by semi-normal hydrochloric acid, which dissolves it with evolution of chlorine.—Pharm. Journ. and Pharmacist, Jan. 1, 1910, 7; from Berichte, 42 (1909), 3326.

Platinum—Formation and Properties of Hexabromoplatinates.—A. Gutbier and Fr. Bauriedel find that if a solution of organic ammonium bromide is added drop by drop to a solution of hydrogen platinum bromide, and the crystalline precipitate re-crystallized from hydrobromic acid, the hexabromoplatinates are obtained in the pure state. Their melting-points could not be obtained with absolute certainty, as the substances liquefy only at very high temperatures and begin to change color previously. They usually dissolve in water at the ordinary temperature, giving beautiful red liquids, and can be re-crystallized from water. They are practically insoluble in absolute alcohol unless a small quantity of hydrobromic acid or water is present, when again they form red liquids. All solutions are yellow when diluted. Concentrated caustic soda in excess colors the solution yellow; they become colorless on warming. Ammonia produces at the ordinary temperature a coloration which disappears on warming. Hydrazine hydrate decolorizes the solution at the ordinary temperature, platinum being separated and nitrogen evolved. Chem. News, Jan. 21, 1910, 36; from Ber. d. Chem. Ges., 42 (1909), No. 16.

Platinum Sulphates—Conditions of their Formation.—Marcel Delépine finds that platinum dissolves in sulphuric acid in presence of an inert gas according to the equation $2\text{Pt} + 7\text{H}_2\text{SO}_4 = 2\text{Pt}(\text{OH})(\text{SO}_4\text{H})_2 + 3\text{SO}_2 + 4\text{H}_2\text{O}$. In contradiction to Quennessen's results the author has found that the presence of oxygen is unnecessary, and oxygen does not combine with platinum-black at the temperature of boiling sulphuric acid, though it does combine with the sulphurous gas dissolved in the acid holding the

platinum-black in suspension. The products of the reaction are platinum sesquioxysulphate, $\text{Pt}(\text{OH})(\text{SO}_3\text{H}_2)$, and a new red-brown crystalline substance which appears to be $\text{Pt}(\text{OH})_2\text{SO}_3\text{H}_2\text{O}$. Chem. News, Mar. 4, 1910, 107; from Compt. rend., 150, (1910), No. 2.

RHODIUM.

Rhodium—Gravimetric Reduction of its Compounds.—A. Gutbier and L. v. Müller have proved that the reduction of rhodium compounds to metal by means of hydrazine hydrates can be used for gravimetric analysis. By working with solutions which are not too concentrated the metal is separated, not as a black amorphous powder, but in the form of glittering, metallic scales. The derivatives used for the analysis were "chloropentamminrhodium" chloride, $\text{Rh}(\text{NH}_3)_5\text{Cl}_2$, and the corresponding bromide, $\text{Rh}(\text{NH}_3)_5\text{Br}_2$ —Chem. News, Aug. 27, 1909; from Ber. d. D. Chem. Ges., 42 (1909), No. 10.

IRIDIUM.

Iridium—Atomic Weight.—E. H. Archibald has determined the atomic value of iridium, using for this purpose potassium chloroiridate prepared from two sources: one from osmo-iridium ore, the other from metallic iridium. The potassium chloroiridate was analyzed by weighing the dry salt, reducing it in hydrogen, and estimating the hydrochloric acid formed, the potassium chloride, and the metallic iridium set free. The results show a value of 192.90 for the atomic weight of iridium.—Chem. News, Sept. 24, 1909, 150.

Iridium—Halogen Compounds.—A. Gutbier and M. Riess find that concentrated hydrobromic acid when added to a solution of iridium chloride gives a dark blue solution on warming. If bromine vapor is allowed to act on the liquid the compound H_2IrBr_6 is obtained in the form of a bright blue solution. The same result can be obtained by mixing concentrated alkali bromide solution with iridium chloride solution at the temperature of the water-bath. Hexachloroiridates are formed when alkali bromide solutions act on excess of iridium chloride. These crystalline chlorosalts are converted into hexabromoiridates by dissolving them in hot dilute hydrobromic acid and allowing bromine vapor to act on the filtrate while it cools. The hexabromoiridates are anhydrous and stable in air, but are decomposed when gently heated, giving off bromine vapor.—Chem. News, Dec. 17, 1909, 304; from Ber. d. D. Chem. Ges., 42 (1909), No. 14.

Hexa-halogen Iridates—Formation and Properties.—A. Gutbier and M. Riess find when bromides of organic ammonium compounds are dropped into iridium chloride solution containing dilute hydrochloric acid, bromine escapes, and the corresponding hexachlorous iridate separates in the form of a red-brown crystalline precipitate. If the chlorous salt is boiled with

dilute hydrobromic acid, the liquid, which was originally red-brown, turns first yellow, then green, and then suddenly becomes dark blue, the chlorous salt being converted into hexabromous iridate. These bromous salts form dark blue or black crystals, which dissolve in water and in hydrobromic acid to give a blue liquid. They are not so stable as the alkali hexabromous iridates, and are much affected by light.—Chem. News, Febr. 25, 1910, 96; from Ber. d. D. Chem. Ges., 42 (1909), No. 8.

Osmium—Analytical Determination of its Oxides and Chlorides.—Otto Ruff and Ferd. Bornemann have studied the characters of the oxides and chlorides of osmium and the methods for their analytical determination. They find that ammonium hexachloro-osmate— $(\text{NH}_4)_2\text{OsCl}_6$ —prepared from sodium hexachloro-osmate can be purified by making a cold saturated solution and salting out the double salt by means of saturated ammonium chloride solution, and potassium hexachloro-osmate can be prepared in the pure state by oxidizing the raw product, heating to 120°C ., and receiving the OsO_4 in pure caustic potash, afterwards washing with alcohol. To determine osmium in presence of chlorine or fluorine in aqueous solution the following method may be adopted: Excess of alcoholic alkali is added to the solution, which is heated on the water-bath. The excess of alkali is then neutralized with $\frac{\text{N}}{2}$ acid, and heating is continued. The osmium dioxide then separates in flakes; it is heated for six hours on the water-bath and then filtered off; the precipitate is gradually heated to 150°C . in a current of carbon dioxide containing alcohol, and then to 250°C . in a current of carbon dioxide, and then weighed as OsO_2 . The authors have found that Klobbie's method of determining OsO_4 can be adapted to the determination of the other oxides of osmium, while titration with permanganate shows the degree of oxidation of the osmium compounds. Moraht and Wischin's osmium acid is a hydrate of osmium dioxide. The pure anhydrous dioxide is blue-black in color; it is oxidized by concentrated sulphuric acid on warming. The authors have obtained three chlorides of osmium: (1) OsCl_2 , prepared by heating osmium in chlorine at a low temperature, and slowly cooling the yellowish-brown vapors thus formed. It is a hygroscopic powder, which is hydrolyzed by water. (2) OsCl_3 , formed on heating osmium in chlorine to a higher temperature, and rapidly cooling the gaseous chloride. It is a brown exceedingly hygroscopic powder, which is very soluble in water. (3) OsCl_4 , obtained by heating the trichloride to 500°C . in an atmosphere of chlorine at 350 Mm. pressure or *in vacuo*. It is a dark brown insoluble powder.—Chem. News, April 15, 1910, 180; from Ztschr. Anorg. Chem., 66 (1910), No. 4.

Osmium—Formation and Properties of Hexachloro-osmates.—Pure osmium metal was converted by A. Gutbier and K. Maish into sodium hexachloro-osmate, and by double decomposition with alkaline chlorides the

rubidium and caesium hexachloro-osmate were obtained. They form octohedral crystals of the regular system, which are soluble in cold water. The pure aqueous solutions decompose very readily in air, becoming darker, until finally a fine black powder separates. They dissolve in dilute hydrochloric acid, giving stable solutions from which they can be recrystallized. The compounds are anhydrous and are stable in dry air. They correspond in chemical behavior to the hexachloroplatinates, as well as in their crystallographic character.—Chem. News, Jan. 21, 1910, 35; from Ber. d. D. Chem. Ges., 42 (1909), No. 16.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(INCLUDING VOLATILE OILS AND DERIVATIVES.)

Paraffin—Rapid Test for its Detection in Lard.—In view of a recent adulteration of lard with small percentages of paraffin, H. S. Shrewsbury has devised the following test: 5 Gm. of the melted lard are measured in a cylinder, transferred to a 200 Cc. Reichert flask, and saponified with 20 Cc. of glycerol soda, made by mixing 100 Cc. of approximately $\frac{N}{10}$ NaOH (453 Gm. soda and 1,000 Cc. water) with 500 Cc. of glycerol. The hot mass is dissolved in 50 Cc. of industrial (non-mineralized) methylated spirit, added very gently, drop by drop, from a pipette. The solution is allowed to cool, and its appearance observed when cold. If it is clear, paraffin wax is absent. As little as 2 per cent. of paraffin wax makes the solution cloudy with opaque flocculi. After some time the solution sets to a jelly, when it may again be observed. Genuine lard gives a slightly opalescent but homogeneous jelly. Two per cent. of paraffin wax shows as opaque flocculi distributed throughout the otherwise nearly transparent jelly, and gives a very characteristic cloudy appearance.—Pharm. Journ. and Pharmacist, Sept. 18, 1909, 365; from Analyst, August, 1909, 348.

The above test devised by Mr. Shrewsbury is according to the opinion of Dunlap not so delicate as that of Holde for the detection of mineral oil in fatty oils, which can advantageously be applied to the testing of lard for paraffin wax. The test is applied thus: From 0.3 to 0.45 Gm. (10 drops) of the melted fat is saponified in a test-tube with 5 Cc. of approximately $\frac{N}{2}$ alcoholic potash, and to the clear hot soap solution water is added in successive quantities of about 1 Cc., the solution being carefully observed after each addition of water. While pure lard gives a clear solution of soap after dilution with 5 Cc. of water, the presence of even 0.5

per cent. of paraffin wax is indicated by the formation of a turbidity, the "silky" appearance of which is characteristic of paraffin wax. It is possible by this method to detect as little as 0.3 per cent. of paraffin wax in lard or margarine fat. The method also serves as a rapid sorting-test in the examination of tallow, which is now frequently adulterated with "fish-oil stearine" and paraffin wax, samples recently examined containing from 1 to over 20 per cent. of the latter adulterant.—*Ibid.*, Jan. 8, 1910, 27; from *Analyst*, Dec., 1909, 524.

Bismuth Betanaphtholate has been examined by W. A. Puckner and W. S. Hilpert with the idea in view of comparing the various brands on the market and to establish a uniform standard. The paper appears in "Proceedings," 1909, 859-868.

Naphthol-Halogen Derivatives Used as Disinfectants.—Bechold mentions a number of halogen derivatives and their respective uses and values as disinfectants. *Bromo-* and *Chloro-β-Naphthol* are most powerful disinfectants, exceeding mercurial compounds in bactericidal power. *Tri-bromobetanaphthol* is the most active of these against *staphylococci*, *streptococci*, and diphtheria bacillus; *dibromobetanaphthol* is most effective against *B. coli*. *Dibromonaphthol* and *dichloronaphthol* are active against *B. typhosus*, and the activity decreases as the chlorine or bromine in the molecule is lessened. All these are practically odorless and non-toxic. *Tetrabromoparadiphenol* and *tribromod cresol* are very active against *staphylococci*, but are less active than lysol against *B. coli*. *Tribromo-* and *tetrabromobetanaphthol*, *tetrabromo-orthocresol*, and *tetrabromo-orthodiphenol*, although active in some directions, are without action towards the tubercle bacillus. *Tri-* and *tetrabromonaphthol* and *tetrachloro-orthodiphenol* are very active disinfectants of pus. A 1 per cent. solution of *tri-* or *tetrabromonaphthol* will sterilize the hands perfectly in eight minutes. In addition to the above, fifteen other naphthol-sulphonic and bromo-derivatives were experimented with. These were found to be inert towards staphylococci.—*Pharm. Journ. and Pharmacist*, Febr. 26, 1910, 237; *D. Med. Wschr.*, 1909 (45).

Benzaldehyde Ammonia—Formation and Properties.—Francis finds that when ammonia acts at a low temperature on a concentrated solution of benzaldehyde in a mixture of alcohol and water, a crystalline addition product of composition $(C_6H_5CHO)_2NH_3$ separates. This "benzaldehyde ammonia" is *aa'*-dioxo-dibenzylamine, and is very unstable, rapidly giving hydrobenzamide, water, and benzaldehyde. Further, the author finds that "p-tolylaldehyde" behaves similarly, giving the corresponding compound with ammonia.—*Chem. News*, Aug. 27, 1909, 107; from *Ber. d. D. Chem. Ges.*, 42 (1909), No. 10.

Azobenzene and o-Oxy-Azobenzene—Production from Aniline by the Action of Caustic Potash.—A. Bacovescu finds that when colorless freshly

distilled aniline is intimately mixed with caustic potash the mixture becomes slightly warm and turns reddish brown. The reaction is at its maximum when one part of aniline is present to twelve parts of alkali. The products of the reaction are "azobenzene" and "o-oxy-azobenzene," $\text{HO.C}_6\text{H}_4.\text{N}:\text{N.C}_6\text{H}_5$. Caustic potash also acts on azobenzene and converts hydrazobenzene into azobenzene. Azobenzene is also produced when KMnO_4 acts on aniline, or when aniline is oxidized in alkaline solution by hypochlorite. It is probable that oxidation by the oxygen of the air takes place in the experiments described, and that the caustic potash merely induces the reaction.—Chem. News, Oct. 29, 1909, 219; from Ber. d. D. Chem. Ges. 42 (1909) No. 13.

Italian Ichthyol—Yield and Characters.—F. Marino-Luco and Jole Tonolli have subjected a bituminous slate occurring in large quantities in Tuscany to dry distillation in iron retorts, obtaining about 8 per cent. of a dark brown oil, which on fractionation yielded a fraction boiling between 100°C . and 255°C . The dried oil was composed of 69.56 per cent. C., 8.73 per cent. H., 2.27 per cent. N., 7.79 per cent. S., and 11.65 per cent. O. The ichthyolsulphonic acid prepared from this oil by Rudolph Schröter's method is a dark brown, soft, viscous mass, soluble in water, but insoluble in salt solutions and completely precipitable from its aqueous solution by saturated solution of sodium chloride. 10 Gm. of the oil yielded with pure concentrated sulphuric acid 12 Gm. of ichthyolsulphonic acid, from which an ammonium salt was prepared corresponding in all its characters with the well known German preparation. It contained 1.24 per cent. ammonia, 13.05 per cent. total sulphur, of which 2.52 per cent. was in sulphonic—the other 10.53 per cent. in sulphidic combination—thus establishing a relation of the sulphonic to the sulphidic sulphur of 1:417, an important consideration since the value of ichthyol depends upon its content of sulphidic sulphur, which is comparatively high in this Italian product.—Pharm. Ztg., LV (1910), No. 37, 376; from Gaz. Chim. 39, II, 575-579.

Amber—Solubility in Different Solvents.—Experimenting with amber in small, hard, amber-colored pieces, interspersed with a few softer, white pieces, Coffignier subjected the substance to the action of various solvents at their boiling point for two hours with the following results, showing the percentage of substance remaining undissolved: Alcohol 85.7; methylalcohol, 88.7; amylalcohol, 75.8; ether, 81.2; chloroform, 82.7; benzol, 78.8; acetone, 76.70; oil of turpentine, 83.1; benzaldehyde, 67.9; aniline, 69.3; amyl acetate, 70.0; carbon tetrachloride, 88.5.—Pharm. Ztg., lv (1910), No. 20, 205; from Chem. Zentralbl., 1910, No. 6.

Nerol—An Abundant Constituent of Oil of Helichrysum Angustifolium.—Heine states the essential oil of *Helichrysum angustifolium* is very rich in "nerol," yielding as much as 40.65 per cent. of *neryl* acetate; and

since nerol is a valuable constituent of "synthetic rose oil," the oil of helichrysum should prove a valuable commercial source of this. Nerol has a rose-like odor, and has been found, in small quantities only, in the oils of neroli, petit-grain, rose and lignaloe. To obtain pure nerol, the saponified oil is treated with phthalic anhydride or the anhydride of a dibasic acid, with which it forms acid esters. These are either separated by saponification and shaking out with immiscible solvents, or by fractionation *in vacuo*; or the nerol is converted into the benzoic ester, and separated from the more volatile bodies which accompany it by fractional distillation under reduced pressure.—Pharm. Journ. and Pharmacist, July 24, 1909, 105: from. Chem. Techn. Report, 33 (1909), 295.

Terpinolene—A New Adulterant of Volatile Oils.—John C. Umney mentions as the latest adulterant of volatile oils a by-product resulting from the manufacture of terpineol, which has received the name of "terpinolene." It is apparently formed by the action of mineral acids in the process of preparing terpineol from oil of turpentine, constituting an optically inactive hydrocarbon, which lends itself admirably for the adulteration of spike lavender oil, for which purpose it is said to be used.—Chem. & Drugg., Aug. 14, 1909, 292.

In connection with the preceding it is interesting to note some observations made by Ernest J. Parry in an article on adulterated petitgrain oil (which see), which evidently refer to the adulterant mentioned by Mr. Umney. Mr. Parry says that manufacturers of terpineol appear to accumulate a large amount of residues which contain the oxidation and other alteration products of turpentine formed during the course of terpineol-manufacture. This oil can be obtained for a few pence per lb., and is a viscous oil, containing a fair amount of free alcoholic substances, of high specific gravity (up to 0.930) and various hydrocarbons. It has not yet been thoroughly investigated, but it appears to be imported into England, and he believes that it is used for the adulteration of some essential oils. Indeed, that such products are offered is plainly evident from a circular recently issued by a Continental firm of chemical manufacturers in which the following statement occurs:

"We beg to draw your attention to our synthetic 'neutral ethers,' which is a product suited for mixing with essential oils which naturally have a high ester-content; 1 per cent. of our ethers appears on saponification as 3 per cent. of esters, such as linalyl acetate, and it is absolutely impossible for an analyst to differentiate between such esters and our product." This "neutral ether" proved to be impure *ethyl citrate* to which attention has been previously called.—Ibid., Sept. 4, 1909, 410-411.

Volatile Oils of the U. S. P., VIII—A Critical Review.—At the January meeting of the New York Branch of the A. Ph. A., Paul Jeancard and Conrad Satie communicated a comprehensive criticism and review of volatile

oils described in the U. S. P., VIII, in which they point out that these descriptions are not always consistent with the established facts of science and industry. The authors say that in most European countries the function of pharmacopœias is to consider products only as utilized in pharmacy. In the United States, on the other hand, the Pharmacopœia has the authority of a legal standard not only for products which are intended for pharmaceutical use, but for table consumption as well, and that therefore an official book with so broad a province should maintain great exactitude in its descriptions and strict precision in the analytical methods which are used to demonstrate the quality of products. But, notwithstanding the great amount of work which has been accomplished by the authors of the U. S. P., VIII, it is lacking in this precision. The high professional standing of Messrs. Jeancard and Satie as authorities on volatile oils and perfumes makes their criticism on the description of these in the U. S. P., VIII, easily one of the most important contributions for the guidance of the committee having in charge the revision of the U. S. P. IX. The authors consider the subject in two divisions—collecting in the first in a systematic manner the analytical methods scattered here and there in the Pharmacopœia, and in the second part looking up and discussing the individual oils and some of their constituents. These must necessarily be referred to in the original, but the following questions will indicate the drift of the arguments made for the betterment of the pharmacopœial descriptions: "Volatile oils are mixtures of certain chemical bodies, such as terpenes, alcohols, ketones, etc. They have no fixed physical or chemical properties, the properties varying within certain limits, which depend on the place of origin of the plant, the climatic influences, the condition of cultivation, method of preparation, etc." "The limits of variation in a given property of a substance, which have been recorded by investigators during a number of years, may be spoken of as 'general limits.' These represent the extremes of variation; but the authors also recognize 'annual limits,' which, however, would be more restricted than the former and would necessitate a more exact determination of the purity of a substance. A pharmacopœia which is in force for ten years or longer should make use of general limits only, since it is evident that those limits represent the extremes of variability. But a pharmacopœia whose directions have authority for ten years is a strange thing in an epoch in which the most important discoveries succeed each other, and when industrial developments are revolutionizing the customs of the world." "The United States Pharmacopœia possesses all the faults of the pharmacopœias of other nations. These faults are results of the method of compiling the books. They are edited with much care and with inexhaustible patience, and are so thoroughly edited that by the time they appear they are about ten years behind contemporary science."—*Amer. Drugg.*, Jan. 24, 1910, 40-43.

The Volatile Oils of the U. S. P. is the subject of a paper presented at the meeting of the New Jersey Pharmaceutical Association by Charles H. LaWall, in which he makes some practical observations upon facts in connection with volatile oils in general and the official oils in particular. He states that there is no class of official substances about which the retail pharmacist is more at the mercy of the manufacturer than that of volatile oils, and therefore points out the character of tests and examination prescribed by the Pharmacopœia which can conveniently be carried out by the pharmacist of average ability. In recapitulating, he mentions that of the thirty-four volatile oils officially recognized in the U. S. P. VIII, there are ten only which require apparatus or manipulative skill not usually possessed by the pharmacist; but that, after all, the criticism by which the pharmacist should finally judge a volatile oil, even when it answers the official requirements, is that afforded by the physical attributes of odor and flavor. For, no matter if an oil responds to every given test, if it be not of fine quality in this respect, it is wise to reject it upon this ground, even if it be cheap.—Proc. N. J. Pharm. Assoc., 1909, 102-104.

Essential Oils—Value of Refraction Indices.—Ernest J. Parry says that the experience of the past few years has demonstrated the fact that the refractometer is an absolutely necessary instrument in a laboratory where essential oils are examined. It is true that there are cases where the direct determination of the refractive index of an oil gives little information, but this is equally true of the optical rotation and the specific gravity. But as in many cases the common adulterant of a given oil has a refractive index well outside the limits of that of the pure oil, this determination often becomes of great value. The fullest information, however, can be obtained by using one's judgment in the examination of the various fractions obtained in the fractional distillation of an oil where, with type samples, fairly constant results are obtained and compared with those of the suspected oil. For example, an oil with an apparently normal ester-content, such as lavender oil, will show a maximum amount of esters in a given fraction, whereas if adulterated with such esters as ethyl citrate, the esters will be found in quite a different fraction, and will affect the refractive index of that fraction in a quite abnormal manner. Again, the very low refractive index of alcohol will be at once an indication of the presence of small quantities of that body—a point of great importance when one is dealing with oils of which only small samples are available, such as otto of rose. Where alcohol has been added to adjust the high refractive index of another adulterant, it is at once indicated by a distinct rise in the refractive index of the oil after being well washed with water. Mr. Parry appends a long list of refractive indices of: (1) Constituents of essential oils; (2) of essential oils themselves; and (3) of essential-oil adulterants and other bodies. These indices in most cases represent a number of deter-

minations in each case, many of them over five different samples of the same body and in some as high as 20 to 30 samples.—Chem. & Drugg., Jan. 29, 1910, 178.

Discussing the same subject, T. F. Harvey and J. M. Wilkie say that the observation of the refractive index of a fluid substance is so conveniently and rapidly made with modern instruments, and requires so small an amount of material, that it is worth observing even in those cases where (as with many essential oils) the information obtained is not of much diagnostic value. It still serves in these cases to mark, for example, sudden changes in the character of supplies and to make rapid comparisons between bulk consignment and buying samples, etc. For technical purposes the Abbé refractometer (scale 1.3000 to 1.7000, with water-jacketed prisms connected with a heating-apparatus, is commonly used. In this instrument about two drops of the liquid is enclosed as a thin film between the faces of two prisms made of suitable glass, light (which may be artificial) being reflected from a mirror through the prisms. The refractive index is recorded upon a scale reading directly to the third decimal, the fourth place being obtained by eye-estimation. A number of consecutive readings should yield figures not differing by more than about 0.0002. The adjustment may be checked occasionally with pure distilled water, which has an index of 2.3330 at 20° C. A heating-apparatus is provided in order to bring the circulating water, and consequently the prisms, to a constant temperature, which may be arbitrarily chosen, and which for solid fats, such as butter, etc., is usually 40° C., and for liquid substances 20° C. These authors also append to their paper a long tabulated list giving the refractive indices—often in very many samples of the same substance—of: (1) volatile oils, B. P., 1898; (2) volatile oils, not official; (3) fixed oils; (4) corrections for the refractive indices determined in the preceding lists.—Ibid., March 19, 1910, 50-51.

Volatile Oils—Use of the Centrifuge in the Assay.—Frank X. Moerk, following up his suggestion made in a paper presented to the Association in 1908 (see Proceedings, 1908, 900) that the assays of some of the volatile oils could be more conveniently and accurately made by the aid of the centrifuge than by the official method of shaking the oils with reagents in a flask or burette, has made and records a number of experiments with different oils which substantiate his opinion. Using the Babcock cream bottles and calculating the undissolved oil to volume percentage, the experiment as carried out upon the oils of *cloves*, *pimenta* and *thyme*, is described as follows: "Mix the carefully measured oil with 30-35 Cc. alkali solution, cork the bottle, shake thoroughly for several minutes, add sufficient alkali solution to bring the mixture well up into the graduated part, cork and whirl in the centrifuge until the insoluble oil separates as a clear layer." This, with 800-1000 revolutions per minute, requires 3 to 10 minutes. It is important that the bottle be corked during centrifugation.

Remarkably constant results are thus obtained as shown in a tabulated statement. In the case of *oil of cassia*, in which the aldehyde is dissolved in bisulphite, certain modifications of the official method are necessary before subjecting the mixture to the action of the centrifuge.—*Amer. Journ. Pharm.*, July, 1909, 326–328.

Volatile Oils—Antiseptic Value in Dentistry.—D. Gilmour, among other properties which make volatile oils valuable in dentistry, mentions the following in the order of their antiseptic value, together with their principal uses: *Oil of cassia*, undoubtedly the most potent as a germicide, has an antiseptic value equivalent to 1 drop in a culture of 2233 drops. In the same way *oil of cinnamon* = 1–2100; *oil of cloves*, 1–1150; *oil of bay*, 1–1028; *oil of peppermint*, 1–875; *oil of eucalyptus*, 1–600; *oil of thyme*, (?); *oil of cajuput*, 1–120; *oil of gaultheria*, not sufficiently antiseptic to be of any particular use as a root-canal dressing.—*Pharm. Journ. and Pharmacist*, May 21, 1910, 844; from *Brit. Dental Journal*.

Volatile (and Fixed) Oils—Use of Antiseptic to Determine the Iodine Number.—F. Borde, following the Hübl method for determining the iodine number of volatile and fixed oils, titrates the excess of iodine with a solution of 1.88 Gm. antipyrine in 100 Cc. of 50 per cent. alcohol, instead of sodium thiosulphate solution. The end of the titration is easily recognized by a faint yellow color. 1 Cc. of the antipyrine solution (which keeps indefinitely) corresponds to 0.254 iodine.—*Pharm. Ztg.*, lv (1910), No. 18, 181; from *Bull. des. Scienc. Pharmacol.*, 1909, 654.

Ajowan Oil—Constituents.—Schimmel & Co., after the lapse of a considerable time since they carried out any investigations as to the separate constituents of oil of ajowan seed (*Carum Ajowan*, Benth. et Hook, *Etychotis Ajowan*, D. C.), have resumed their investigations of a mixture of hydrocarbons from this oil, usually designated as “Thymene,” of which a large quantity had been reserved for this purpose. Previous researches had shown that “thymene” is a mixture of p-cymene and an unknown terpene. In order to determine the nature of the terpene it was split up into five fractions, of which the first, third and fifth in particular were more closely investigated, as explained in some detail. The results show that “thymene” is mainly composed of p-cymene, and that of terpenes, α -pinene, dipentene, and γ -terpinene were present—the last-named in the largest proportion. Phellandrene (α and β) although a constituent of oil of ajowan herb; could not be detected.—*Schimmel's Semi-An. Rep.*, Oct. 1909, 14.

Oil of Star Anise—New Constituents.—Besides anethol, of which star anise oil contains about 90 per cent., the bodies so far definitely ascertained to be constituents of the oil are: pinene, l-phellandrene, hydroquinone ethyl ether, methyl chavicol, anise aldehyde, anisic acid, and anisic ketone. To these safrol was added by Oswald (1891), while Tardy (1902)

states that it contains terpineol, a lævorotatory sesquiterpene, and a body melting at 213°C . Absolute proof of the presence of the two last-named bodies has, however, not been given, and Schimmel & Co. have therefore considered it desirable to repeat the investigations as regards the terpenes, especially in view of the knowledge which has been gained in the chemistry of terpenes in recent years. The results of these investigations, which are described in some detail, show that star anise oil contains, in addition to its previously known constituents, *p*-cymene, cineol, safrol, and terpineol; also, that the *phellandrene* present is a mixture of *l*-*a*- and β -*phellandrene*.—Schimmel's Semi-An. Rep., April, 1910, 99–101.

Arnica Root Oil—Constituents.—Kondakow has isolated from the volatile oil of arnica root an unsaturated hydrocarbon, m. p. 176° to 180°C ., a solid body, m. p. 69°C ., and a sulphurous compound. He was also able to confirm the presence of iso-butyl phlorol and of dimethyl-thymohydroquinone, which were originally discovered by Siegel.—Schimmel's Semi-An. Rep., Oct., 1909, 25 : from Journ. f. prakt. Chem., ii, 79 (1909), 505.

Artemisia Oil—High Percentage of l-Camphor a Constituent.—Th. Whittelsey has obtained from the green branches and leaves of a kind of *Artemisia* (perhaps *A. Cana*, Pursh.) having its habitat at the Western parts of North America, 1.2 per cent. of a powerfully aromatic volatile oil, which on fractionation yielded 44.5 per cent. of *l*-camphor. This camphor was identified by preparing its semi-carbazone. It is possible to obtain the camphor directly from the original oil by placing it in a freezing mixture. The oil showed the following constants:—Sp. gr. at 15°C ., 0.9405; opt. rot. 19.09°C .; refract. index (20°C .) 1.4702; acid no., 4.1 to 4.2; sap. no., 22.7 to 23.9; sap. no. after acetylation, 110.3 to 111.8. The occurrence of *l*-camphor in essential oil had up to the present been observed only in the oils of feverfew, tansy, *Artemisia Herba-alba*, *Blumea balsamifera*, and of a species of *Salvia*, possibly *S. grandiflora*.—Schimmel's Semi-An. Rep., April, 1910, 19; from Wallach Jubilee Publication (1909), 668.

Oil of Artemisia Herba-alba var. densiflora—Characters and Constants.—Schimmel & Co. having again distilled a parcel of the herb of *Artemisia Herba-alba*, obtained a yield of 0.58 per cent. of oil, which differs in several respects from that described by them in a previous report. It is also of a brownish-yellow color and is distinguished by a pungent odor, which was only perceptible in a slight degree in the former sample. On the other hand, in the recently-distilled sample the odor of thujone or sage does not appear until some time after preparation. But the principal difference lies in the change of optical rotation, for whereas the old oil was lævorotatory, the new sample is dextrorotatory; it also contains considerably more alcoholic constituents than did the old oil. All these

variations may perhaps be explained by the fact that the oil distilled last year was prepared from the flowering herb, whereas on the present occasion the flowers were very little developed. The constants of the new sample are as follow: $d_{15} 0.8994$, $a_D + 14^\circ 5'$, $n_{D20} 1.46684$, acid no. 4.6, ester no. 35.0, ester no. after acetylation 163.3; dissolves in 1.8 vol. and more of 70 per cent. alcohol, with separation of paraffin.—Schimmel's Semi-An. Rep., Octob., 1909, 25.

Asparagus Oil—Yield and Characters.—Haensel's Report describes the volatile oil obtained by distillation from dried asparagus roots, previously carefully purified and washed. The yield calculated on the original drug used was 0.0108 per cent. of a dark brown oil, having an intensely acidulous and very strong odor and giving the following constants: Sp. gr. at 23°C. , 0.8777; saponification no. 101; acid no. 33; ester no. 68. A solid acid, identified to be palmitic acid, was isolated from this oil.—Pharm. Ztg., liv (1909), No. 83, 822.

Algerian Aurantiaceous Volatile Oils—Properties.—A. Chapus describes a number of Algerian volatile oils obtained from the orange. He finds that Algerian *Bigarade neroli oil* is richer in esters than that produced in the South of France; but its optical rotation and specific gravity are normal. It contains from 25 to 31.99 per cent. of esters calculated as linalyl acetate; its $a_D = + 5^\circ 42'$ to $+ 6^\circ 6'$; and its specific gravity ranges from 0.8723 to 0.8768. Algerian *Portugal neroli oil* is richer in esters, and has a higher specific gravity than Spanish oil, but the optical rotation of the latter is higher. The figures obtained with Algerian oil are: Specific gravity 0.8731; $a_D = + 26^\circ 15'$; esters 34.18 per cent. Algerian *Bigarade petitgrain oil* is markedly lævorotatory, $a_D = -5^\circ 5'$; specific gravity 0.8755; esters 42.39 per cent. Algerian *Portugal petitgrain* is dextro-rotatory, $a_D + 21^\circ 33'$; specific gravity 0.8705; esters 21.62 per cent. These figures are based on experiments with oils distilled from material gathered in the presence of the author from native Algerian varieties of the respective orange trees. The observed differences are attributed mainly to climatic influence, modified possibly by the botanical variety of the source of the material. The influence of the method of treatment is also under consideration.—Pharm. Journ. and Pharmacist, Jan. 22, 1909, 81; from Journ. de Pharm. et Chim., 30 (1909), 484.

Bigaradia Oil (Oil from the Rinds of Bitter Oranges)—Constants.—Roure-Bertrand Fils have determined the constants of Bigaradia oil (from the rinds of bitter oranges) produced in the Comoro Islands to be as follows: Sp. gr. 15°C. , 0.8812; opt. rotation, $+ 42^\circ 13'$; soluble in all proportions of 90 per cent. alcohol; insoluble in 80 per cent. alcohol.—Rep. Roure-Bertrand Fils, October, 1909, 42.

Oil of Basil from Comoros—Constants.—Roure-Bertrand Fils have determined the constants in oil of Basil received from the Comoro Islands, of

which they report as follows: Sp. gr. at 15° C., 0.9588; rotation, $+0^{\circ}35'$; soluble in 0.3 vols. of 80 per cent. alcohol; sapon. no. 1, 4.2; esters (calculated as linalyl acetate), 1.5 per cent. The oil possessed a fine odor. Report of Roure-Bertrand Fils, October, 1909, 42.

Bay Oil—Low Eugenol Content from the Fiji Islands.—Schimmel & Co. report that two samples of bay oil produced in the Fiji Islands, sent to them from the Imperial Institute in London, showed respectively a phenol content of 23 and 24 per cent. As compared with the normal commercial oils, which contain about 60 per cent. of eugenol, the two samples show an exceptionally low phenol-content, which may be due to the manner of manufacture. In the course of the distilling-process one part of the bay oil separates out on the surface of the receiver, while the other sinks to the bottom; hence if a normal oil is to be produced, these two parts must be carefully mixed after distillation. If this is neglected, the result is that the oils obtained are sometimes too light, and at other times too heavy, because owing to unworkmanlike distilling, they lack some portion of either the light or the heavy oil. It may therefore be surmised that in the case under review a similar mistake was made during the distillation. Schimmel's Semi-An. Rep., October, 1909, 27.

Oil of Bergamot—Encouraging Development of its Production following the Earthquake.—Discussing the consequences of the earthquake on the Sicilian and Calabrian essential-oil industry, Eduardo Jacob, of Catania, who is regarded an authority, makes some encouraging observations concerning the progress made in restoring this industry. "In the case of oil of lemon, only the principle center of collection, Messina, was destroyed, while the extensive producing area remained almost free from damage by earthquake; on the other hand, in the case of bergamot oil, the entire producing country was ravaged by shocks, and it will therefore be desirable to add a word concerning the present conditions in Southern Calabria:—The manufacture of oil of bergamot invariably takes place on small farms which are scattered round about the numerous towns, townships and villages of Southern Calabria. All these places have been more or less destroyed by the earthquake, and a large part of the population is buried under the ruins. But as everywhere the communities were small (even in Reggio the number of survivors probably does not exceed 20,000), it was much easier here than it was in Messina to procure new dwellings for the remaining people, and to-day the visitor to Calabria sees everywhere in the earthquake-region round about the older townships new and more or less pleasantly built settlements of sheds. In Messina scarcely one-third to one-half the survivors have returned to the quarter of the town where the sheds have been erected, and these are mostly of the poorer classes; but in Calabria it may be said that the whole surviving population has returned, especially the well-to-do. For this reason life in that district was able to

resume its normal course much more quickly than was the case in Messina. The soil is again being cultivated; the lemon, bergamot and orange gardens being tended, and the simple tools required for the bergamot industry have been partly dug up from the ruins and partly replaced by new ones; in short it may be asserted that, in common with other occupations, the bergamot oil industry has here again overcome its initial difficulties and is now able to go on as before. Schimmel's Semi-An. Rep., October, 1909, 57-59.

Oil of Bergamot—Ingenious Adulteration.—John C. Umney has examined several samples of oil of bergamot which, although the esters appeared to be normal in quantity, aroused his suspicion by a difference in odor and a curious weakness. Further experiments lead to the belief that these particular samples were adulterated with oil of orange or its terpenes, which at present prices is much cheaper than oil of bergamot. By the use of this terpene, however, the ester percentage is reduced and the optical rotation minimized; but to counterbalance these divergences, a splendid body was forthcoming in "terpineol acetate," which has a pleasant but weak odor and the following characters:

Specific gravity at 150° C.....	about 0.960.
Optical rotation (100 mm.)	<i>nil.</i>
Boiling range.....	220° to 230° C.

Commercial samples estimated approximately 90 per cent. of terpineol acetate. This is now being supplied by manufacturers abroad, with instructions for mixing and a statement that an addition of 1 per cent. to the particular oil will raise the indicated ester percentage of the oil, calculated as linalyl acetate, by a certain proportionate amount.

Among the bodies that are being offered in addition to linalyl acetate are ethyl citrate, ethyl benzoate, and benzyl benzoate, the use of which in raising the apparent ester percentage is obvious from the following data:

1 per cent. of ethyl citrate = apparently 2.1 per cent. of linalyl acetate.

1 per cent. of ethyl benzoate = apparently 1.1 per cent. of linalyl acetate.

1 per cent. of benzyl benzoate = apparently 1.0 per cent. of linalyl acetate.

In the samples of bergamot oils above referred to, the presence of terpineol acetate was determined without difficulty by saponification of the oils, the lilac odor of terpineol being then sufficiently marked to be observed, even through the powerful odor of linalool.

The author concludes that any bergamot oil having a rotation over + 20° C. should be rejected, and over + 18° C. should be viewed with grave suspicion. Two samples of the present season's bergamot oil, of *undoubted purity*, gave the following constants:

	1st Sample.	2nd Sample.
Specific gravity at 15° C.....	0.883	0.884
Rotation (100 Mm.).....	+ 17°	+ 17°
Esters	40.6 per cent.	41.5 per cent.
Non-volatile matter	5.2 per cent.	5.2 per cent.

Furthermore, any oil yielding a non-volatile residue of under 5 per cent. after drying for two hours on a water-bath should be deemed impure and sophisticated with bodies yielding practically no residue.—Chem. & Drugg., Sept. 4, 1909, 411.

Birch-bud Oil—Characters.—Schimmel & Co. find that birch-bud oil distilled during the present season has more or less the same constants as a sample described in a previous report. The odor was pleasantly balsamic, the color lemon-yellow, and the sample contained a large proportion of paraffin, crystals separating out plentifully at + 8° C., while at + 5° C. it was completely congealed. Its other properties are as follows: d_{15}^{20} 0.9730, a_D — 5° C. 34', n_{D20}^{20} 1.50153, acid no. 2.8; ester no. 51.4 = 24.1 per cent. acetate of a sesquiterpene alcohol of the formula $C_{15}H_{24}O$. Ester no. after acetylation 150.0 corresponding to 66.4 per cent. total alcohol $C_{15}H_{24}O$. 0.25 vol. of 90 per cent. alcohol was sufficient to dissolve the oil, but when more alcohol was added a plentiful separation of paraffin set in quickly.—Schimmel's Semi-An. Rep., Octob., 1909, 28.

Cajuput Oils.—Characters as Obtained from Different Species of Melaleuca.—Baker and Smith have examined the cajuput oils obtained from *Melaleuca uncinata* and from *M. nodosa*. The oil from *M. uncinata* had the following characters; Specific gravity, 0.9259; rotation, + 7.2°; refractive index, 1.4788; saponification number, 3.05; solubility in 70 per cent. alcohol, 1 in 1.5. The oil contains much cineol, a small amount of *d*-pinene, a sesquiterpene, and a crystalline substance melting at 72.5° C., to which the authors give the name uncineol. It is an alcohol having the formula $C_{10}H_{18}O$. The oil from *Melaleuca nodosa* contained 33 per cent. cineol, the remainder being principally *d*-pinene, with a little sesquiterpene: specific gravity, 0.898; rotation, + 11.6°; refractive index, 1.4689; saponification number, 7.24.—Chem. and Drugg., Jan. 29, 1910, 151.

Oil of Camphor—Presence of Cadinene in High-boiling Fractions.—Twenty years ago (1889) Schimmel & Co. reported the presence of cadinene in the high-boiling fractions of camphor oil. Observations of the low sp. gr. of some camphor oil fractions of high boiling points have now induced them to investigate the subject afresh. For this purpose they employed a pale yellow, heavy camphor oil fraction possessing the following constants: b. p. 106° to 120° C. (7 Mm.) d_{16}^{20} 0.9378, a_D + 11°, n_{D20}^{20} 1.50188. Any phenols present were removed by shaking with 5 per cent. caustic soda liquor, and the remainder was fractionated. The b. p. now lay between 97° and 116° C. (5.5 to 6 Mm.). As the b. p. rose the

the sp. gr. decreased from d_{150} 0.942 to d_{150} 0.905, while on the other hand the rotation increased from $\alpha_D + 4^\circ 52'$ to $\alpha_D + 16^\circ 53'$. No hydrate, nitrosite or nitrosate was obtained, but from the intermediate fractions they succeeded in isolating small quantities of a nitrosochloride, although the yield of this was too small to admit of further examination. Cadinene must therefore presumably be looked for in fractions of oil having still higher boiling points.—Schimmel's Semi-An. Rep., Oct., 1909, 31.

Camphor—Rapidly of Volatilization.—Charles H. LaWall has made a series of experiments undertaken with the object of determining to what extent, if at all, manufacturers of camphorated oil and spirit of camphor, when products are found to be below strength, are justified in attributing this deficiency to the volatilization of the camphor in the preparation. The results of these experiments, which are given in some detail, show that both lump camphor and the powder steadily lose by vaporization, but that the preparations mentioned do not lose any appreciable amount of camphor by volatilization—the spirit *even increasing* appreciably in strength.—Proc. N. J. Phar. Assoc., 1909, 545–546.

Synthetic Camphor—Comparison with Natural Camphor.—W. Johnson makes a plea for the recognition of synthetic camphor in the next British Pharmacopœia, on the ground that the two camphors, natural and synthetic, are identical in molecular composition, smell, appearance, solubility and rubefacient properties, and probably also in therapeutic action. Some of the earlier samples of synthetic camphor did not have the same smell or solubility, but that has now been rectified in the best makes. The points of dissimilarity of the two camphors are the following: The synthetic is slightly purer than the refined natural camphor, since it is free from oil of camphor. The synthetic is optically inactive and is said by some to melt at 165°C. ; the natural is dextrorotatory and melts at 175°C. , but it is reported that the *new* synthetic camphor also shows a melting point of 175°C. The new synthetic camphor appears to be slightly less active on the respiratory and nervous systems, but the difference is so small as to be negligible. In fact, the author quotes the opinions of qualified scientists and therapeutists which justify his belief that the two camphors are equal in quality and effect.—Pharm. Journ. and Pharmacist, Oct. 30, 1909, 534.

Oil of Cardamom—Monograph Proposed for the National Formulary.—In the course of a discussion following the submission of formulas by George M. Beringer for some new basic elixirs proposed for introduction in the revised edition of the National Formulary, some doubt was expressed as to the availability of authentic and pure oil of cardamom required in the formula for a compound elixir of cardamom, as an article of commerce and likewise as to its keeping. Mr. Beringer has therefore undertaken and completed a very thorough inquiry into the subject, cor-

responding with a number of representative firms, manufacturers, and persons of authority, which are communicated in an abstract together with a personal experience with this oil extending over a number of years during which he has satisfactorily employed it as a flavoring ingredient of various preparations. On the basis of reliable information so obtained, which should be consulted in the original paper, Mr. Beringer proposes the following "Monograph" for inclusion in the N. F. if this oil should be admitted in that standard :

Oleum Cardamomi—Oil of Cardamom.

A volatile oil distilled from the seeds *Elettoria cardamomum* White et Matron (Fam. Zingiberaceæ). It should be kept in well-stoppered amber-colored bottles, in a cool place, protected from light.

A colorless or very pale yellow liquid having the characteristic aromatic, penetrating, and somewhat camphoraceous odor of cardamom and a warm, persistently pungent, and strongly aromatic taste.

Specific gravity 0.924 to 0.947.

Very soluble in alcohol and dissolves readily and clearly in 4 volumes of 70 per cent. alcohol.

It is dextrogyrate, the angle of rotation varying from $+22^{\circ}$ C. to $+40^{\circ}$ C., in a 100-Mm. tube, at a temperature of 25° C.—Amer. Journ. Pharm., April, 1910, 167-175.

Celery Oil—Constituents.—While engaged in preparing sedanolide and sedanonic acid, two constituents of celery oil discovered by Ciamician and Silber in 1897 (see Proceedings, 1898, 976), Schimmel & Co. took the opportunity of examining in detail the remaining constituents, using an oil of their own distillation, which possessed the following constants: $d_{15} 0.846$, $n_D^{20} + 67^{\circ} 51'$, $n_D^{20} 1.48566$. When distilled *in vacuo* about 60 per cent. passed over at the boiling-point of the terpenes, then followed an intermediate fraction of about 3 per cent. water, after which about 15 per cent. passed over between 110° and 130° C. (9 mm.) and 8 per cent. between 175° and 202° C. (9 mm.) The residue of distillation was 10 per cent. The results of the research show that oil of celery consists of not less than 60 per cent. of hydrocarbons, that is to say, 60 per cent. of *d-limonene* and about 10 per cent. of *d-selinene*, a bicyclic sesquiterpene not previously observed in essential oils. *Alcohols* are present in the oil to the extent of 2.5 to 3 per cent. From the portions with a high boiling point which had already been examined by Ciamician and Silber, from 2.5 to 3 per cent. of pure *sedanolide* and 0.5 per cent. of *sedanonic anhydride* were isolated.—Schimmel's Semi-An. Rep., Apr., 1910, 32-35.

Oil of Celery Seed—Yield, Characters and Constants.—John Swenholt obtained by steam distillation from 21292.8 Gm. of celery seed (lifeless) 521.0 Gm. (2.446 per cent.) of volatile oil, which was collected in two portions as follows: The portion passing over during the first twenty minutes,

amounting to 256.0 Gm.; the remaining portion, amounting to 265.0 Gm., which passed over more slowly, requiring several days of interrupted distillation. These two oils, designated respectively "light oil" and "heavy oil," were very different. The first oil was light-colored and possessed a limonene-like odor, while the second oil was of a yellowish color, possessed a distinct odor of celery and was heavier. Portions of the two oils were subsequently mixed in the proportions obtained (100 Gm. of lighter oil and 103.5 of the heavier), for the purpose of examination, which resulted as shown in the following table:

	Light oil.	Mixed oil.	Heavy oil.
Color	Colorless	Lemon yellow	Dark yellow
Odor	Limonene-like	.....	Celery
Specific gravity at 20° C.	0.8408	0.8596	0.8774
Observed angle of rotation in 50 mm. tube at 20° C.	+ 46°57'2"	+ 40° 0'24"	+ 32°52'48"
Specific angle of rotation at 20° C..	111°40'45"	99°32'42"	74°56'54"

After standing for eight months the light oil still had a faint celery odor, whereas the heavy oil had lost its agreeable odor and smelled like a resinified turpentine oil. The mixed oil had a strong and pleasant celery odor. The specific gravities of all three oils were redetermined and show an increase in each case, as here recorded:

	Light oil.	Mixed oil.	Heavy oil.
Specific gravity at 20° C.	0.8528	0.8726	0.9690
Increase in specific gravity	0.0120	0.0130	0.0916

—Midl. Drugg. and Pharm. Rev., May, 1910, 220-221.

Oil of Chamomile—Two Distinct Oils in the Flower.—There are, as is well known, plants containing different oils in different parts, although all the oils are formed in schizo-lysigene cells, and are therefore built up in a similar manner. In the chamomile flower, however, essential oil is formed in two entirely different parts, which differ from each other with regard to the oil cells. This fact has been taken by A. James as the starting point of a study on the essential oil of chamomile (*Matricaria* ? Rep.). The hollow calyx of this composite flower contains, at the part where the leaves are attached, a wreath of collateral bundles of cells, and in front of the phloëm of these are schizogene structures containing a secretion. The fruit-whorl and the stem of the flower is provided with hairs which secrete oil. These hairs consist of two rows of cells, showing the character-

istic type of the glands of the compositæ. In both containers, owing to the position of the secreting cells, the oil is formed centrifugally. The author has distilled both oils separately, obtaining from 4 Kgm. of pure flowers 14 Gm. of oil (= 0.35 per cent.), and from 1 Kgm. of pure calices 5.1 Gm. of oil (= 0.51 per cent.).

The oil from the pure flowers possessed the familiar deep blue color of chamomile oil, was viscous at the ordinary temperature, and showed the following constants: Sp. gr. at 15° C., 0.954; opt. rotation, $\pm 0^\circ$; $n_D^{21^\circ}$, 1.363734; sapon. number, 74.7.

The oil from the pure calices, also viscous at the ordinary temperature, was faintly green and turned yellow in a few days. It had the sp. gr. at 15° C., 0.949; opt. rotation $\pm 0^\circ$; $n_D^{21^\circ}$, 1.363716; sapon. no. 33.7.—Schimmel's Semi-An. Rep., Octob., 1909, 37; from Apoth. Ztg., xxiv (1909), 585.

Chamomile Oil—Distinct Oils in the Florets and Receptacle.—A. Jama has made the interesting observation that chamomile flowers (*Matricaria chamomilla*) contain two distinct volatile oils, the florets yielding a blue oil while the receptacle yields a faint greenish volatile oil, changing to yellow-brown after a few days. The distinguishing characters and constants are shown in the following:

Chamomile Oil.		
	<i>From the petals.</i>	<i>From the receptacle.</i>
	Deep blue.	Faint greenish soon changing to yellow-brown.
Yield.....	0.35 per cent.	0.51 per cent.
Sp. gr. at 15° C.....	0.954	0.949
Refraction at 21° C.....	1.3637344	
Rotation in 100-Mm. tube	± 0	± 0
Saponification number.....	74.4	33.7

The author is inclined to the belief that the transient greenish color of the oil from the flower receptacles is due to the unavoidable presence of some of the petals, or fragments of them during distillation. He finds, moreover, that the blue oil from the petals does not change its color readily unless the oil is contaminated with some of the oil of the receptacles. The blue oil retains its beautiful color for a long time unchanged when exposed to direct light, but when mixed with an equal quantity of the brown oil, it rapidly changes and also acquires a brown color. On saponification the blue oil retains the odor of chamomile unimpaired, whereas the receptacle oil loses it completely and acquires instead an odor resembling that of lavender.—Apoth. Ztg., xxiv (1909), No. 65, 585-586.

Oil of Champaca Flowers—Preparation in the Philippines.—According to Bacon experts in the Philippines esteem the yellow variety of champaca

flowers above the white, and maintain that it has the finest odor of any flower in the archipelago. An attempt made by Bacon to obtain oil from the flowers by steam distillation was a failure, only a very small quantity being obtained and its odor did not much resemble that of the flowers; but an oil of excellent and intense odor was obtained by macerating the flowers in paraffin oil for 24 hours and treating the oil with absolute alcohol—the same paraffin oil being used repeatedly for the extraction of the flowers. The author proposes to continue his experiments, using volatile solvents in place of paraffin oil. The champaca tree can be raised easily from the seed and bears as early as the third year.—Schimmel's Semi-An. Rep., Octob., 1909, 38; from Philippine Journ. of Sc., 4 (1909), A, 131.

Chrysanthemum Oil—Constituents and Constants.—According to S. Keimatzter, a yellowish-brown oil, obtained in the amount of 0.8 per cent. from the flowers of (?) *Chrysanthemum sinense* var. *Japonicum* (locally known as "Rionō-Kiku"), contains i-camphor, of which body 40 Gm. were isolated by the freezing-out process from 250 Gm. oil. The camphor was identified by means of its oxime (m. p. 116 to 117°, inactive), paracamphoric acid (i-camphoric acid) m. p. 202°, and its β -bromo derivative (m. p. 61°). The oil which was left behind after the removal of the camphor still contained considerable quantities of i-camphor. This oil had the following constants: $d_{15} 0.9304$, $[\alpha]_D + 12^\circ 4'$, acid no. 0, ester no. 0. In the fraction with the lowest b. p. l-camphene could be detected and was identified by conversion into isoborneol.—Schimmel's Semi-An. Rep., Oct., 1909, 38; from Journ. Pharm. Soc. Japan, 1909, No. 326, 1.

Cinnamon Oils—Difference in Composition According to Source.—In an exhaustive article on the distribution and cultivation of the cinnamon tree, Coyle mentions that in the case of *Cinnamomum Currie*, Bl., which yields the Chinese cinnamon bark, all parts of the tree yield an almost identical volatile oil, containing 75 to 90 per cent. cinnamic aldehyde, whereas in *Cinnamomum Zeylanicum*, Nees, the oils differ according to the part of the plant from which they have been prepared—the oil from the bark and branches being characterized by its content of cinnamic aldehyde, that from the leaves by *eugenol*, and that from the root-bark by *camphor*. The author distinguishes a third species in *Cinnamomum Lourerii*, Nees, which furnishes the cinnamon used in Japan. The oil from the root bark of the plant contains, besides cinnamic aldehyde, a *terpene with a lavender-like odor*. The oil exported from Tonquin and Annam is said to be derived from *C. Lourerii*.—Schimmel's Semi-An. Rep., October, 1909, 38; from Journ. d'Agriculture tropicale, 9 (1909), 164.

Cinnamon-bark Oil—Distinction from Cassia-bark Oil and Cinnamic Aldehyde.—Experiments recorded by Charles Alexander Hill and illuminated by a number of tables, pointed out that cinnamon-bark oils, genuine and possessed of a true and delicate cinnamon flavor, are characterized

by and distinguished from cassia oil and cinnamic aldehyde by: (1) a low specific gravity (below 1.04); (2) a low refractive index (below 1.58); (3) a low aldehyde-content (below 65 per cent.), and by affording a green color with ferric chloride. Furthermore, it was shown that a high proportion of cinnamic aldehyde raises both the specific gravity and the refractive index, and that adulteration with leaf oil would, of course, result in an unduly high proportion of eugenol.—Chem. & Drugg., June 25, 1910, 59.

Citronella Oil—A Distillate Produced in the Malay Peninsula.—B. J. Eaton, Government Chemist of the Federated Malay States, has examined a locally distilled citronella oil, which came from Perak. In its general behavior this oil corresponded with the Java oil. The color was pale yellow, the total oxygenous content was 82.4 per cent., of which 27.7 per cent. was geraniol and 54.7 per cent. citronellal; sp. gr. at 15.5° C., 0.8890; soluble in its own weight and more of 80 per cent. alcohol.—Schimmel's Semi-An. Rep., Octob., 1909, 43.

Citronella Oil from German New Guinea—Inferior Geraniol Content.—In continuation of the information given by Schimmel & Co. last year regarding citronella oil from German New Guinea (see Proceedings, 1909, 310), they now give the following constants of a similar oil, since received from the German Colonies in the Southern Pacific: $d_{15} 0.8964$, $n_D^{20} 1^{\circ}20'$, geraniol and citronellal content 78 per cent, soluble in its own volume and over of 80 per cent. alcohol. Although this oil also resembles the Java oil in its general characteristics, its geraniol content is rather less, and falls below that of the sample examined last year by about 8 per cent.—Schimmel's Semi-An. Rep., April, 1910, 37.

Oil of Citronella from Comoros—Constants.—Roure-Bertrand Fils have determined the following constants in an oil of citronella produced on the Comoro Islands, which, although possessing a fine odor, was completely insoluble even in absolute alcohol: Sp. gr. at 15° C., 0.8922; opt. rot.,— $0^{\circ}52'$; insoluble, even in absolute alcohol; aldehyde (determined by the bisulphite method), 80 per cent.—Rep. of Roure-Bertrand Fils, October, 1909, 42.

Java Citronella Oil—Citral a Constituent.—Some years ago (see Proceedings 1900, 749) Schimmel & Co. showed that Java oil contains citronellal, geraniol and d-citronellol, and subsequently proved the presence of methoxyl groups in the oil, which points to the occurrence of methyl-eugenol. So far no further constituents had been made known, but they have now succeeded in isolating a previously unknown constituent from Java citronella oil, namely, *citral*, which is, however, present only in small amount—computed at about 0.2 per cent.—Schimmel's Semi-An. Rep., April, 1910, 37.

Citronella Oil—Possibly a Protection Against the Tsetse Fly.—Schimmel

& Co. direct attention to an article by A. W. G. Bagshaus, in which it is stated that the tsetse-fly (*Glossina palpalis*), so much feared as the medium by which the sleeping sickness is conveyed, has a pronounced dislike of citronella grass; hence an extension of the cultivation of this grass would afford an additional means of combating this dangerous insect. Seeing that the fly's aversion to this grass is probably entirely due to the oil present in the citronella grass, the advisability of experiments as to how far it would be possible to protect man and beast by means of citronella oil is suggested.—Schimmel's Semi-An. Rep., Oct., 1909, 44.

Oil of Cloves—Sophistication with Camphor Oil Fractions.—Schimmel & Co. describe sophisticated oil of cloves, expressly represented as having been distilled from cloves, which at first seemed normal, but on closer examination was found to contain in the phenol content, besides eugenol, impurities with an odor reminding of creosote, while the portions which were freed from phenol contained an abundant quantity of safrol. The examination was undertaken because of the high optical rotation and deficient degree of solubility. Evidently this oil is a simple concoction, made up principally of suitable camphor oil fractions.—Schimmel's Semi-An. Rep., April, 1910, 43.

Oil of Cloves—Newly-Discovered Constituents.—H. Masson describes a series of newly-discovered constituents in clove oil, embracing the following: Methyl-n-amyl carbinol (Heptanol-2); furfur-alcohol; methyl-n-heptyl carbinol (nonanol-2); benzyl-alcohol; methylfurfur-alcohol?; *a*-methyl-furfurol; dimethylated furfurol; methyl salicylate. The existence of the last named had heretofore not been proved with certainty.—Schimmel's Semi-An. Rep., April, 1910, 44; from Compt. rend., 149 (1909), 630 and 795.

Coniferous Volatile Oils—Constants of Authentic Specimens.—John Swenholt communicates the results of the preparation and examination of four different coniferous oils obtained by distillation with cohobation from authentic specimens of leaves and branches received from Colorado. The quantities of oils so obtained were too small to permit a complete examination, and the constants determined must therefore be accepted with considerable allowance. The leaves and branches of

Pinus Murrayana yielded about 5 Cc. of oil with an agreeable odor, devoid of terebinthinate characteristics. Its saponification number was 51.87, corresponding to 18 per cent. of ester when computed as $C_{10}H_{17}OCOCH_3$.

Picea Englemanni, leaves and branches, yielded about 15 Cc. of oil having a decided camphoraceous odor. Sp. gr. 0.8950; a_D in 50-Mm. tube = + 1° 55' 38"; sapon. number, 24.15, corresponding to 8.5 per cent. of ester.

Pinus Edulis yielded about 10 Cc. of oil having an odor which, aside

of a slight reminder of petroleum, was rather agreeable and devoid of terebinthinate characteristics. Sp. gr. 0.8653; a_D in 50-Mm. tube = $-3^\circ 36' 58''$; sapon. number, 17.55, corresponding to 6 per cent. of ester.

Pinus Flexilis yielded about 10 Cc. of oil. Odor slightly camphoraceous. Sp. gr. 0.8670; a_D in 50-Mm. tube = $+4^\circ 0' 28''$; sapon. number, 43.14, corresponding to 15 per cent. of bornyl acetate.—Midland Drugg. & Pharm. Rev., Dec., 1909, 611-612.

Pine Needle Oil—Influence of Method of Distillation.—Fifteen years ago Schimmel & Co. reported on an oil from *Pinus silvestris* L., which had been distilled from green pine needles collected in winter. A large parcel of branches from *Pinus silvestris* received a considerable time ago, has now afforded them an opportunity of once more distilling this oil, which is almost unknown in commerce, and at the same time of making experiments with a view of ascertaining in how far the mode of distillation affects the product obtained. The material was distilled partly dry and partly after having been soaked with water; the separate fractions as well as the oil from cohobation being each examined separately. Finally all the parts of the same oil were poured together and compared with a sample of an oil which had been obtained by one continuous process of distillation. The table below gives a review of the results obtained:

	Oil per cent.	d_{15}^0	a_D	$n_D^{20}^0$	Acid no.	Ester no.	Ester no after Acetyl.	Ester per cent.	Total Borneol per cent.
1. Dry Steam Distillation.									
(a) Obtained after 3 hours.	0.189	0.8721	$+5^\circ 36'$	1.47568	1.8	6.3		2.2	
(b) Obtained after another 4 hours.....	0.1	0.8797	$+3^\circ 45'$	1.47917	2.8	2.3		0.8	
(c) From cohobation	0.0075	0.8913	$+1^\circ 56'$	1.48306	4.1	10.9		3.8	
Total of a, b, and c	0.2965	0.8755	$+5^\circ$	1.47715	2.6	5.6	18.6	1.9	5.2
2. Water and Steam Distillation.									
(a) Obtained after 3 hours.	0.173	0.8773	$+5^\circ 31'$	1.47811	0.9	6.5		2.3	
(b) Obtained after another 4 hours.....	0.152	0.8882	$+5^\circ 50'$	1.48180	3.6	5.6		1.9	
(c) a and b combined	0.325	0.8824	$+5^\circ 41'$	1.47996	2.4	6.0		2.1	
(d) Total distillate after 7 hours altogether	0.197	0.8822	$+3^\circ 10'$	1.41899	2.8	9.3	26.0	3.3	7.3

—Schimmel's Semi-An. Rep., April, 1910, 91.

True Lebanon Cedar Oil—Preparation and Characters from Authentic Wood.—In 1892 Schimmel & Co. had described in their April Report an oil which they at the time believed to be the distillate of authentic Leba-

non cedar wood, but which was subsequently discovered to be wood derived from a species of *Juniperus*. They are now in position to give some particulars of a really authentic oil from the wood of *Cedrus Libani*, Barr. (*Pinus Cedrus*, L.; *Abies Cedrus*, Poir.; *Larix Cedrus*, Mill.). The authentic wood yielded about 3 per cent. of a lemon-yellow oil of a pleasant balsamic odor, reminding at the same time of methylpeptenone and thujone. This oil possessed the following constants: d_{15}^{20} , 0.9427; $a_D = +80^\circ 20'$; n_D^{20} , 1.51254; acid number, 0.5; ester number, 3.0; ester number after acetylation, 19.8; soluble in 5 to 6 vols. of 95 per-cent. alcohol.—Schimmel's Semi-An. Rep., October, 1909, 132.

Oil of Juniper Berries—Oxygenous Constituents.—As known, the principal constituents of juniper berry oil are the hydrocarbons *pinene* and *cadinene*. Schimmel & Co. have now made an examination of the oxygenous compounds of this oil, which has shown them to consist in great part of the alcohol *terpineol*—the same as occurs in the oils of cardamom and marjoram. Another alcohol, however occurs in addition to *terpineol*, but in far smaller proportions. This alcohol has the following constants: b. p. 105° to 110° C. (8 Mm.) 218° to 226° C. at atmospheric pressure; d_{15}^{20} , 0.9476; $a_D = -4^\circ 30'$; n_D^{20} , 1.48248. It combines readily with phthalic acid anhydride, and was isolated from the fractions boiling between 95° and 130° C. in the form of the acid phthalic ester. In its odor the alcohol reminds of geraniol and borneol, and it is probably a mixture of various alcohols. Besides the compounds enumerated, juniper oil contains bodies of a particularly characteristic odor, most of which occur in small proportions in the fraction boiling between 72° and 88° (8 Mm.).—Schimmel's Semi-An. Rep., October, 1909, 71-73.

Oil of Turpentine—Improved Method of Examination.—Paul Nicolardot and Louis Clement urge the use of fractional distillation under reduced pressure in place of ordinary distillation in the examination of oil of turpentine for adulterants. By this means the optical rotation of the successive fractions of the pure product is not altered nor the non-volatile residue increased, while the operation is completed in twenty minutes. The presence of petroleum spirit is indicated by the increasing rotatory power of the first fractions, while a sharp drop in rotatory power in the last fraction is indicative of resin oil. On exposure to light and air, turpentine undergoes oxidation, and its rotatory power is diminished when examined several hours later, but this diminution is still more marked if resin-products have been added. Other portions of the same sample kept in the dark with like conditions as to temperature and evaporation do not undergo appreciable change except in the case of samples containing petroleum spirit, in which the evaporation raises the rotatory power.—Chem. & Drugg., April 9, 1910, 46; from Ann. de Chim., Febr. 15, 1910, 53.

Oil of Turpentine—Detection of Petroleum.—M. Mansier observes that

during recent years the high price of oil of turpentine has led to its being adulterated with light petroleum, and moderate quantities of the latter are very difficult to detect. A useful test for this purpose is afforded by the bromine-absorbing capacity of the sample; this must be determined under definite fixed conditions, as the amount of bromine absorbed by pure oil of turpentine varies with varying conditions. The following method was found to give satisfactory results:—1 Cc. of oil of turpentine is put into a stoppered flask with 5 Cc. of chloroform, and 50 Cc. of 3 per cent. bromine water is then added and the whole well shaken; more bromine water is then added a few drops at a time, shaking after each addition, until the chloroform layer retains a slight yellow color lasting for one minute after shaking. Tested in this way, 1 Cc. of pure oil of turpentine absorbs 1.69 Gm. of bromine; if this is contained in 60 Cc. of bromine water, turpentine containing 10 per cent. of petroleum would only use 56 Cc. of the latter: if it contained 20 per cent. 49 Cc., and if 50 per cent. 32 Cc. The bromine water that is used must be freshly prepared, and its exact strength must be determined immediately after the test on the turpentine. Pharm. Journ. and Pharmacist, Jan. 1, 1910, 7; from Rép. d. Pharm., Oct. 10, 1909, 454.

Oil of Turpentine—Distinctions of that Distilled from the Oleoresin and from the wood.—S. S. Jacobs finds that no essential difference is presented in the specific gravity and refraction index of oils of turpentine distilled from the wood and from the oleoresin, and that the optical rotation of either may be to the right or left, dependent on the source of the material. The chief point of difference in the two oils appears to exist in the boiling point of the fractions, the oil from oleoresin ceasing to distil at 165° C., while the oil from wood continues to distil up to 185° C., leaving in either case a very small residue; the characteristic odor peculiar to each of the two oils affording the only other distinctive difference.—Amer. Journ. Pharm., May, 1910, 232.

Oil of African Copaiba—Composition and Constants.—H. von Soden has published the results of an investigation into the composition of an oil from African copaiba. By passing hydrochloric acid into the ethereal solution he obtained from the oil (constants: $d_{20} 0.920$; $n_D^{20} + 16^\circ 50'$; ester number, 5.6; ester number after acetyl., 10) a hydrochloride, m. p. 116° to 119° C. ($n_D^{20} - 3^\circ$ in 10 per cent. benzene solution). The hydrocarbon regenerated therefrom had the following constants: b. p. 274.5 to 276° C. (743 Mm.); $d_{20} 0.928$; $n_D^{20} - 94^\circ$. These properties agree with those of l-cadinene. It was not possible to arrive at a conclusion as to the particular sesquiterpene which occurs in the oil. Apparently, however, the conditions are somewhat similar to those which prevail in West Indian sandalwood oil, of which Deussen converted the dextrorotatory sesquiterpene into l-cadinene by way of the hydrochloride.—Chem. Ztg., 33 (1909), 428.

Referring to the above, Schimmel & Co. give the results of a recent investigation of the oil of African copaiba, which agree with those obtained by von Soden.—Schimmel's Semi-An. Rep., October, 1909, 46.

Coriander Oil—Constituents—Schimmel & Co. observe that heretofore only d-pinene and d-linalool have been known positively as being constituents of coriander oil. They have now made a comprehensive examination of an oil distilled in their laboratories from ripe coriander seed, having the following constants: sp. gr. at 15° C., 0.8735; opt. rot., + 10° 24'; refract. index, 20° C., 1.46287; ester no. 20. 22. By this investigation, the details of which are briefly described, they have now determined the following bodies as being constituents of coriander oil: d-*a*-pinene, β -pinene, phellandrene (?), cymene, dipentene, *a*-terpinene, γ -terpinene, terpinolene (?), n-decyclic aldehyde, d-linalool, geraniol, l-borneol, and acetic esters of these alcohols.—Schimmel's Semi-An. Rep., October, 1909, 47-49.

Cumin Oil—Constituents.—Schimmel & Co. report the results of an investigation into the constitution of cumin oil (*Cuminum Cuminum*, L.). This oil has long been known as containing cuminic aldehyde as the principal constituent, but is said also to contain cymene, and a terpene C₁₀H₁₆, which Wolpian called hydrocuminene. The oil examined in the present investigation possessed the following constants: b. p. 165°-380° (754 mm.), d_{15°} 0.921, n_D^{20} + 4° 20' n_{D20°} 1.50784. The hydrocarbons were separated from the fractions with higher boiling points by fractionation *in vacuo*. The fractions possessing a b. p. of over 80° (10 mm.) were shaken up with bisulphite, only small portions being left unaffected by this reagent. The examination therefore fell under the following heads:—I, The hydrocarbon fraction; II, the products reacting with bisulphite; III, the portion not reacting with bisulphite. The results showed that the hydrocarbon fraction (I) consists for the greater part of *p*-cymene, together with small quantities of *d*- and *i*-*a*-pinene, β -pinene, β -phellandrene and dipentene. The aldehyde fraction (II) contained cuminic aldehyde (cuminol) in a state of great purity, and probably small proportions of hydrogenerated cuminic aldehyde. The small portion not affected by bisulphite (III) consisted principally of cuminic alcohol and of a body melting at 97°-107° (3 mm.), which requires further examination.—Schimmel's Semi-An. Rep., Oct., 1909, 49-53.

Galician Dill Oil—Sophistication with Oil of Fennel.—Schimmel & Co. call attention to a sample of dill oil received some time ago, which was suspicious on account of the high specific gravity and too slight optical rotation and high refraction index. Its solubility in 80 per cent. alcohol also left something to be desired, as the solution did not become quite clear. The first impression was that the oil had been distilled from the herb, but this was abandoned by the absence of phellandrene in the oil,

and subsequent examination showed the oil to have been grossly adulterated. The presence of liberal proportions of anethol showed without doubt that the adulterant was oil of fennel. Schimmel's Semi-An. Rep., April, 1910, 47.

Eucalyptus Oil—Australian vs. United States is the subject of an interesting paper by Edward S. Binz, in which he points out the superiority of the American oil, obtained from the cultivated *Eucalyptus globulus*, over the Australian oils, which are mixed oils obtained from different species and usually contains much less of its important constituent eucalyptol. The paper appears in the "Proceedings," 1909, 1054-1055.

African Eucalyptus Oil—Characters and Constants.—Schimmel & Co. have received from the Transvaal and examined a sample of eucalyptus oil which, judging by the odor and by its content of cineol, might have been a crude *globulus* oil. Its constants also lie within the limits laid down for oils of this class: d_{15}° 0.9236, $a_D + 1^{\circ} 45'$, n_{D20}° 1.46337; it was free from phellandrene, soluble in 2.8 vols. of 70 per cent. and more alcohol, and had a cineol-content of about 65 per cent.—Schimmel's Semi-An. Rep., Octob., 1909, 67.

Ficaria Oil—Yield and Characters.—Under the name "ficaria oil," Haensel's Report describes a volatile oil which was obtained by distillation in the quantity of 0.02 per cent. from the herb of *Ranunculus ficaria*. It is a dark brown fluid having a tobacco-like odor and when filtered from a solid deposit had the sp. gr. 0.9101 at 24° C. When heated with ammoniacal solution of silver oxide, it forms a mirror, indicating the presence of an aldehyde. The boiling-point is between 150° and 310° C., but shows no constancy. A solid acid, identified as palmitic acid, was isolated.—Pharm. Ztg., liv (1909), No. 83, 822; from Heinrich Haensel's Report.

Oil of Hyacinth—Preparation and Properties.—C. J. Enklaar obtained the volatile oil of hyacinth by extracting the fresh flowers with cold benzol, distilling off the solvent and purifying the crude oil by treatment with diluted alcohol and petroleum ether, by which fixed oil and wax were almost completely removed from it. The very small quantity of oil so obtained had a sharp and disagreeable odor in its concentrated state, but when largely diluted gave the odor of the flowers to perfection. Chemically it gave no ketone reaction and showed saturation in its behavior with potassium permanganate. The presence of benzyl alcohol, benzyl benzoate and a non-nitrogenous, fluorescent constituent were determined.—Pharm. Ztg., lv (1910), No. 30, 305; from N. Chem. Zentralbl., 1910, No. 8.

Hyssop Oil—Confirmation of Constituents—Referring to their very exhaustive investigation of the constituents of hyssop oil previously reported (see Proceedings, 1908, 325), in which Schimmel & Co. had demonstrated that this oil contained, in addition to β -pinene, an active ketone, *l-pino camphone*, which had hitherto not been observed, their chemists have

made a new series of experiments, with the particular object of absolutely identifying the acid (*l-pinonic acid*) existing in the oil and resulting when the ketone is oxidized with permanganate. These experiments conclusively show the acid contained in oil of hyssop to be *l-pinonic acid*, and the ketone *l-pinocamphone*. This examination became necessary, because Tiemann had obtained by dry distillation of α -dihydroxydihydro campholenic acid, an acid of the composition $C_{10}H_{16}O_3$, which he regarded as *l-pinonic acid*, but which possessed quite different properties.—Schimmel's Semi-An. Rep., Oct., 1909, 68–70.

Oil of Hyptis Suaveolens, Foit—Yield and Properties.—According to Bacon, *Hyptis suaveolens*, Poit, a Labiatae known in the Philippines in the Tagal language by the name of *sub-cabayog*, yields a very small proportion of a green-colored oil with a strong odor of menthol, which in fact, as was shown by further examination, constitutes the chief constituent of the oil. The slight oil-content (200 kilos material produced only 27 Gm. or 0.0135 per cent.) excludes the possibility of distillation on a large scale. Schimmel & Co., however, have previously reported that the yield of oil from the same plant in Java was very considerably higher, namely, 1 per cent.—Schimmel's Semi-An. Rep., October, 1909, 68; from Philippine Journ. of Sc., 4 (1909), A. 130.

Kryptomeria Oil—Constituents.—H. Kimura has obtained and describes the volatile oil obtained from the wood of *Kryptomeria japonica*, the "Sugi tree" of Japan, used for 1000 years or more to construct the barrels for storing rice wine, imparting to it a peculiar flavor. Previous examinations of this oil by Kimoto, and by Kamatzu, have not yielded satisfactory information regarding the constituents of this oil. Kimura now finds it to be composed of 60 per cent. of the sesquiterpenes cadinene and suginene, and of 4 per cent. of an alcohol having the formula $C_{17}H_{34}OH$. The constitution of the latter requires further investigation.—Pharm. Ztg., lv (1909), No. 82, 813.

Oil of Lantana Camara, L.—Yield and Properties of.—According to Bacon, *Lantana camara*, L., a pleasantly odorous plant, flourishes with such extraordinary profusion in the Philippines that it would undoubtedly pay to cultivate it. The yield of oil from the leaves appears to vary greatly according to age, season, etc., as from two parcels of raw material one weighing 60 and the other 110 kilos, the oil-yield was 0.07 and 0.245 per cent. by volume respectively. The oil is pale yellow, with an odor reminding of sage, and has the following constants: $d_{40}^{30} 0.9132$, $a_{D_{20}}^{20} + 11.5^{\circ}$ C., $n_{D_{30}}^{30} 1.4913$. Subjected to fractionation, 50 Gm. oil resulted as follows: 22 Gm. b. p. 125° to 130° C. (12 Mm.), $n_{D_{30}}^{30} 1.4892$; and 24 Gm., b. p. 130° to 140° C. (11 Mm.), $n_{D_{30}}^{30} 1.4970$. In this connection, Schimmel & Co. mention that the West Indian oil of *Lantana odorata*, L., described by them last year (see Proceedings, 1909, 318), agrees

closely in its properties, with the exception of the rotation, with those ascertained by Bacon for oil of *Lantana camara*, L.—Schimmel's Semi-An. Rep., October, 1909, 73; from Philippine Journ. of Sc., 4 (1909), A, 127.

Oil of Lemon—Terpene Constituents.—In view of the abundance of material brought to light by the recent researches into the chemistry of the terpenes, Schimmel & Co. considered it timely for a fresh investigation of the terpene mixture contained in oil of lemon, the results of which they now publish. After removing the oxygenated constituents of the sample under examination by treatment with dilute alcohol, the residual portion was found to possess the following constants: d_{15}^{20} 0.8524, $n_D^{20} + 66.8'$, n_D^{20} 1.47078. Fractional distillation yielded two principal fractions, one boiling at 160 to 178°, the other at 250 to 278°. The first consisted of terpenes, the second, and by far the smaller in point of quantity, of sesquiterpenes. The systematic investigation of these fractions shows that, in addition to d-limonene, long recognized as the principal constituent, the only body which occurs in the oil in relatively considerable proportions is l- β -pinene. Of l- and i- α -pinene, l-camphene, β -phellandrene and γ -terpinene only small quantities were discovered; p-cymene could not be detected at all. The sesquiterpenes only form a very inconsiderable proportion of the oil, which probably, besides bisabolene, also contains cadinene.—Schimmel's Semi-An. Rep., Octob., 1909, 62–65.

Lemongrass Oil—Production in the Philippines.—According to Bacon, a variety of grass which from the characteristics of the lemongrass oil it produces, is regarded as *Andropogon citratus* D. C., is cultivated to a small extent in the Philippines, although it occurs everywhere throughout the Archipelago, both as a garden-plant and in the wild state, and grows in special profusion in the highlands of the province of Benquet. In the Tagal language this oil-grass is called by the name given to it in 1635 by the Spanish Jesuit Juan Eusebius Nürnberg, who was the first to describe it, viz., *tanglat*, or more accurately, *tanglad*. Other native names for the plant are *salai* and *balyoco*; its Spanish name is *Paja de Meca*. At the present time the oil is not distilled commercially. Bacon points out, quite justly, that under the present market-conditions the cultivation of lemongrass would not be profitable, notwithstanding the fact that it grows quickly and produces a rich yield; and he only recommends it as a temporary crop, to be grown until other plantations produce sufficient returns. A grass 4 months old, distilled two days after being cut, produced 0.2 per cent. of an oil with the following properties: d_{15}^{30} 0.894, $n_D^{30} + 8.1^\circ$, n_D^{30} 1.4857; citral content, 79 per cent. On the basis of the quantity of grass produced under experimental cultivation, and also of the oil-yield, Bacon estimates an output of from 230 to 300 kilos of oil per hectare, assuming that three crops can be cut annually. As the cultivation is rather ex-

hausting to the soil, the crop must be changed after three years.—Schimmel's Semi-An. Rep., October, 1909, 76; from Philippine Journ. of Sc., 4, (1909), A., 111.

East Indian Lemon Grass Oils—Distillates at Different Stages of Development.—Schimmel & Co. received through the courtesy of Mr. I. H. Burkill some samples of East Indian lemon-grass oils which are especially interesting, because they have all been distilled at various seasons from grass grown in one district, viz., Jalpaiguri. In July, 1909, Mr. Burkill distilled grass before the flowering period, both locally (Ia) and in Calcutta (Ib). Two months later, in September, he again distilled before flowering (II). Finally he distilled a grass cut while in flower, first using the flowers only (III) and, for another experiment, the leaves only (IV). Hence, had the distillates differed in their characteristics, it would have been possible to draw definite conclusions as to the condition of lemon-grass according to the stage of development of the raw material. No differences of any importance, however, were discoverable in the oil from the flowers and the leaves; these samples showed no material divergence from those prepared from herb before flowering, and no such differences were observable among the various oils distilled before flowering. The oil from leaves is a little richer in aldehydes and rather heavier than the oil from flowers, but the few investigations which have been made so far do not warrant any final conclusions. The constants of the various oils are enumerated in the table below:

No.	Origin, Condition, and Time of Collection of the Grass.	d_{15}°	n_D	Aldehyde Content	
				With NaHSO_3	With Na_2SO_3
A. Non-flowering Jalpaiguri plants.					
I.	Cut in July. (a) Distilled in Jalpaiguri	0.8954	$-0^{\circ} 28'$	90.0 per cent.	84.0 per cent.
	(b) Distilled in Calcutta	0.8924	$-0^{\circ} 49'$	87.0 per cent.	82.0 per cent.
II.	Cut in September, distilled in Jalpaiguri	0.8925	$-0^{\circ} 53'$	85.5 per cent.	83.0 per cent.
B. Flowering Jalpaiguri plants.					
III.	Flowers only	0.8897	$-1^{\circ} 15'$	83.0 per cent.	79.0 per cent.
IV.	Leaves only	0.8916	$-1^{\circ} 5'$	86.0 per cent.	81.0 per cent.

All the five samples gave clear solutions only at first, even with 90 per cent alcohol; when diluted the solutions turned strongly opalescent.—Schimmel's Semi-An. Rep., April, 1910, 73.

West Indian Limette Oil—Properties.—Schimmel & Co. observe that the literature of essential oils contains only sporadic data concerning the

properties of West Indian limette oil obtained by hand-pressing (hand-pressed oil of limette ; hand-pressed lime oil ; ecuelled essence of limes), and that it is therefore probable that in many quarters uncertainty prevails as to the properties which the oil should possess. They therefore believe it to be generally serviceable if they mention the properties observed by them in the case of a warranted pure quality of this oil, but in doing so wish it to be understood that pure oils may occur which vary somewhat in one or another of their constants: d_{15}^0 0.878 to 0.901, mostly between 0.880 and 0.884, $a_D + 32^\circ 50'$ to $+ 37^\circ 30'$, a_D of the first 10 per cent of the distillate rather higher, or at most 4° lower than a_D of the original oil n_{D20}^0 1.482 to 1.486, acid no. up to 3.0, ester no. 18 to 30 ; residue of evaporation 10 to 14 per cent., in one instance 17.8 per cent. The oil gave a cloudy solution in 4 to 10 vols. of 90 per cent. alcohol, with separation of wax- or paraffin-like constituents.

Oil obtained by distillation (distilled oil of limette ; distilled oil of limes ; distilled lime oil) as well as the Italian variety of oil obtained by pressure hardly count as commercial articles.—Schimmel's Semi-An. Rep., October, 1909, 77.

Cayenne Linaloe Oil—Constituents—Roure-Bertrand Fils report the following constituents in oil of linaloe of their own distillation at Cayenne : Methylheptenone, traces ; l-linalool, 90.5 per cent. ; d-terpineol 5.3 per cent. ; geraniol, 2.4 per cent. ; nerol, 1.2 per cent. The oil had the sp. gr. 0.8721 at 20° C. ; $a_D = -12^\circ 56'$; $n_{D20}^0 = 1.4635$.—Rep. of Roure-Bertrand Fils, Oct., 1909, 41.

Oil of Linaloe-Seeds—A Substitute for Oil from the Wood.—The "Chemist and Druggist" observe that the oil from linaloe-seeds is now being imported on a commercial scale. The linaloe trees are now rapidly disappearing from the Mexican forests in consequence of reckless exploitation, and it is with the object of saving the trees that the oil is now being distilled from the seeds. It is not yet ascertained whether the seeds will yield a sufficient quantity of oil to supply the demand. It is stated that the oil distilled from the seeds is not different as regards odor from good essential oils distilled from the wood. The principal difference lies in its optical rotation, the other characters being almost identical with the wood oil, as shown by the following figures :

Specific gravity.....	0.8838
Optical rotation @ 20° C. (100 Mm. tube)	$+1^\circ 30'$
Refractive index @ 18° C.	1.4655
Soluble in 1.5 volumes and over of 70 per cent. alcohol	
" 2.25 " " 65 per cent. "	
" 4. " " 60 per cent. "	
Acid value.....	3.4
Total saponification-number.....	34.3
Esters as linalyl acetate....	10.8 per cent.

Fractional distillation showed the presence of methyl heptenone (boiling-point, 173° C.; specific gravity, 0.853; refractive index, 1.440; melting-point of semicarbazone, 137° to 139° C.), linalol (specific gravity, 0.864; refractive index, 1.4645; optical rotation, $+5^{\circ}$ C. $30'$; melting-point of phenyl urethane, 65° to 66° C.), geraniol (boiling-point, 229° C.; melting-point of diphenyl urethane, 81° C.), nerol (melting-point of urethane, 51° to 52° C.), and terpineol (melting-point of phenyl urethane, 111° to 112° C.).—Chem. & Drugg., Jan. 29, 1910, 152.

Oil of Mentha Silvestris from Ceylon—Properties.—Schimmel & Co. have examined a sample of an oil of *Mentha silvestris*, L., prepared in Cyprus, and received from the Imperial Institute in London, which was found to possess the following properties: d_{15}° 0.9701, $a_D + 31^{\circ} 30'$, n_{D20}° 1.49544, acid no. 2.4, ester no. 20.9, ester no. after acetyl. 171.4, soluble in 3 vols. of 70 per cent. alcohol; (the diluted solution showed slight opalescence); faintly mint-like odor; yellow color. It is obvious that the saponification number of 171.4 after acetylation of the oil cannot in this case be indicative of the menthol content, which, judging by this factor, should have been 54.8 per cent.; for as a matter of fact the sample contained but little menthol. The mint-like odor was chiefly due to the presence of pulegone, of which the oil contained 40 per cent. (isolated with neutral sulphite of sodium). In addition to this a phenol (probably carvacrol) could be detected, from which it is to be supposed that this, also, would become esterified and would help to swell the acetylation value. Owing to the simultaneous occurrence in it of menthol, pulegone and a phenol, the oil cannot be used either as peppermint oil or as European pennyroyal or origanum oil. It is differentiated from oil of peppermint by its much higher specific gravity and by its pronounced dextrorotatory power.—Schimmel's Semi-An. Rep., April, 1910, 123.

Oil of Monarda Didyma, L.—Properties as Obtained from Half-faded Flowers.—Supplementary to a previous report on two oils of *Monarda didyma*, L. (see Proceedings, 1909, 322), the one from the herb, the other from half-faded flowers, Schimmel & Co. now report on a distillate obtained from half-faded flowers during the past summer. They found this oil, obtained in a yield of 0.26 per cent., to possess constants similar to those observed in that distilled a year earlier: d_{15}° 0.8740, $a_D - 15^{\circ} 45'$, n_{D20}° 1.46743, acid no. 4.9 ester no. 5.6, soluble in 3 vols. and over of 70 per cent. alcohol; after the addition of 6 vols. of alcohol paraffin began to separate out in abundance. The color of the oil was lemon-yellow, the odor peculiar, resembling ambergris, and rather faint.—Schimmel's Rep., October, 1909, 80.

Oil of Monodora Grandiflora—Constituents and Constants.—R. Leinbach has obtained from the seed of *Monodora grandiflora*, a plant growing wild in Africa, about 30 per cent. of a soluble oil, constituting a mobile

pale yellow liquid, having the odor of cymene and a taste, at first aromatic, afterwards bitter. This oil possessed the following constants: d_{15}° 0.8574; a_{D15}° — $46^{\circ} 15'$; acid number, 3.9; sap. number, 7 to 12. At room-temperature one part of the oil is soluble in $3\frac{1}{2}$ parts of 90 per-cent. alcohol. In the fractions with the lower boiling-points (64° to 66° C.), which consisted for the greater part of hydrocarbons of the formula $C_{10}H_{16}$, the author found *l-phellandrene*, and it is highly probable that they contain also small quantities of *camphene*. In the fractions boiling between 70° and 85° C., *p-cymene* was found and identified by being oxidized into hydroxy-isopropylbenzoic acid. In the highest boiling fractions, *palmitic acid* and most probably a little *carvacrol* were found, but the major portion consists of a compound, $C_{10}H_{16}O$, constituting a pale yellow oil, to which the aromatic odor of the oil is due. This compound has the sp. gr. at 15° , 0.9351; op. rot., — $90^{\circ} 14'$; b. p., 130° to 154° C. These fractions also contain a sesquiterpene, not yet clearly identified, and a solid body (m. p. 160° to 163° C.) of unknown constitution.—Schimmel's Semi-An. Rep., April, 1910, 77; from Wallach Jubilee Publication (1909), 502.

Oil of Morinda Citrifolia—Properties and Constituents.—Several years ago, C. J. E. Lohmann discovered in the fruit of *Morinda citrifolia*, L., the presence of one of the higher aliphatic acids in conjunction with an ester. This fruit, known locally in Java as *Benkulu* or *Tjangkudu*, yields an essential oil, which was prepared some time ago in Java by A. W. K. de Jong, and has recently been examined by P. van Romburgh. The oil was of a yellowish color, and had a sp. gr. of 0.927 at 13° C. It was cloudy owing to the separation from it of small crystals, which recrystallized from alcohol, melted at 60° C., and, upon analysis, were shown to consist of paraffins. When freed from the crystals the oil was almost entirely soluble in dilute soda-liquor. In the solution *capronic* (m. p. — 5.2° C; d_{15}° 0.932) and *caprylic acid* (m. p. 15.2° C. d_{15}° 0.913) as well as a traces of the higher aliphatic acids, could be detected. In the neutral part of the oil, which only amounted to a few per cent., ethyl alcohol (identified by the b. p. and the iodoform-test); also probably methyl alcohol and alcohols of a fusel-like odor, could be detected after saponification. The occurrence of over 90 per cent. of acid in an essential oil is very rare.—Schimmel's Semi-An. Rep., October, 1909, 80; from Koninkl. Akad. van Wetenschappen te Amsterdam, 1909, 17.

Myrtle Oil from Cyprus—Constants.—Schimmel & Co. call attention to myrtle oil from Cyprus which had the following constants: Sp. gr. at 15° C., 0.9174; opt. rot., + $8^{\circ} 11'$; refrac. index at 20° C., 1.46357, acid no. 0.3; ester no., 20.9; ester no. after acetylation, 63.9; soluble in its own volume and more of 80 per cent. alcohol. This oil has most affinity with the myrtle oils from Asia Minor, but up to the present all attempts to introduce such oils commercially alongside of the oils from Spain and the

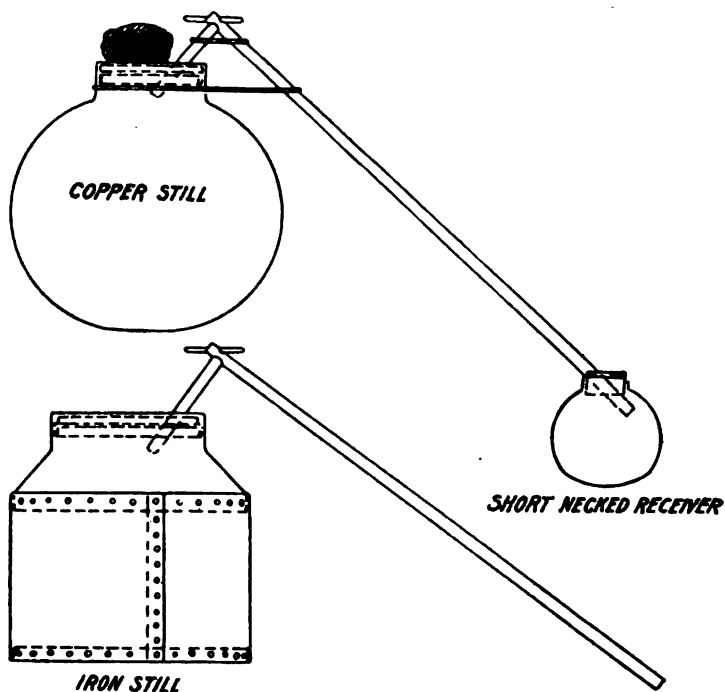
South of France have been unsuccessful.—Schimmel's Semi-An. Rep., April, 1910, 78.

Palmarosa Oil—Distillation in India.—Mr. J. H. Burkill, of the Indian Museum, Calcutta, communicates to Schimmel & Co. a description founded on his own observation of the manner in which “rusa” or “palmarosa” oil is obtained in the district of Amraoti, province of Berar, India, accompanied by photographs and sketches representing the distilling plant in actual use. Mr. Burkill says that the oil distilling industry about Ellichpur is worked in the following way. The forest lands where *Cymbopogon Martini* var. *Motia* grows are leased out to men of substance—generally Mohammedans, who for the most part sub-lease them again piece-meal to men who go out to selected valleys in the Melghat with stills and engaging villagers send some out to cut the grass tops at so much per hundred bundles brought in, and with others set up open-air distilleries on the banks of the streams. There is built first a row of stone fire-places and the cauldrons are set up on them, generally 3 or 4 in a row. The cauldrons are sometimes of iron and sometimes of copper. If they are of copper they are generally somewhat smaller than those of iron and depressed globose; the iron cauldrons are cylindrical and rivetted; they are about $2\frac{1}{2}$ feet in diameter. The top of the iron cauldrons is slightly conical with a central lid. Out of the lid emerges the bamboo elbowed tube by which the distillate passes off. The elbowed tube has a bamboo peg run through it at the angle and is wrapped from end to end in string. From the elbow the longer part is about six feet, the end dipping about 6 inches into receivers, which are generally long-necked, more than a foot in diameter below, not so deep as broad (neck excluded). But sometimes they are without a neck, in which case a pad of cloth on the bamboo closes the mouth. They are generally made of copper. They are placed in the water quite up to the neck. A framework of wood lies in the stream which is generally dammed to deepen the water. Into the interspaces of this framework the receivers fit, being held in place by means of two sticks of wood which are tied on either side of the neck and are placed under the cross bars of the framework. Further, stones are heaped round each receiver to help to keep them under water. The accompanying cut (Fig. 65) exhibits the two kinds of stills, the bamboo conducting tube, and a short-necked receiver.

The stills having been set in place ready for the fire, are never moved, and the distillation is conducted as follows: Supposing that the still or cauldron has just been emptied of a charge, with the lid off and with the fire drawn from below it, a workman standing on the stone walls around the still, measures the depth of the water remaining in it and adds enough clean water to adjust the depth (in a large still) to 10 or 12 inches, whereupon the grass is introduced into the still, packed down, often by trampling so as to get as much as possible into it. According to size the

change will consist of from 100 to 200 bundles of grass, each bundle containing about 300 stems. Next the lid is replaced and the joint luted with a paste of flour of "udid" (*Phaseolus*) and a muddy bandage; the bamboo tube is inserted into the hole in the lid where it fits and is similarly luted in, the fire is started under the still and distillation again begins. The boiling lasts two to three hours (five to six boilings being done in the twenty-four hours), the end of a distillation being indicated by the bubbling of the steam through the increasing distillate, causing a sound which the workmen describe as "titit" and which deepens and becomes what

FIG. 65.



Method of Distilling Palmarosa Oil.

they call "bulbul," when they know it is time to stop the boiling. This is done by removing the fire, throwing cold water over the lid of the still, removing the bamboo tube, and lifting the lid—the pressure of steam at this time being not inconsiderable. In the meantime, the receiver is taken from the stream, and while the men with a hay fork remove the exhausted grass, the master with a spoon takes the oil from the top of the water in the receiver, using a tin funnel to separate it from any water which the spoon brings up with the oil. Table salt to the extent of half a pound is thrown into each still every few days. In some stills lime juice is now

used to help clarify the oil.—Schimmel's Semi-An. Rep., October, 1909, 88–90.

Oil of Peppermint—New Adulterant.—Ernest J. Parry calls attention to peppermint recently appearing on the market, having all the physical characteristics of genuine oil, except that its solubility is not as good as it should be. From a small sample he succeeded in separating by fractional distillation about 20 per cent. of an oil having a refractive index of about 1.430 and an optical rotation of -12° C., which, however, could not be further identified because of the limited quantity of material. Obviously, this is a new adulterant, the nature of which will be determined when larger quantities of material are available.—Chem. and Drugg., Febr. 19, 1910, 293.

French Oil of Peppermint—Constituents.—In continuation of their investigations of French peppermint oil, Roure-Bertrand Fils were able, by fractional distillation of the oil after saponification, to identify the following constituents: 1. Isovaleric aldehyde. 2. Isoamyllic alcohol. 3. 1-Pinene. 4. Δ^3 -p-Menthene (?). 5. Cineol. These constituents amount to about 6 per cent. of the oil examined. Analysis also showed the oil to contain 38 per cent. of free and 13.5 per cent. of esterified menthol, as well as 6.4 per cent. of menthone. Further details as to the investigation, which are still proceeding, are promised.—Schimmel's Semi-An. Rep., October, 1909, 98; from Rep. of Roure-Bertrand Fils, April, 1909, 76.

Oil of Petit-grain—Constants.—Roure-Bertrand Fils have determined the constants in a sample of oil of petit-grain received from Mr. R. Plairieau, of Anjouan, Comoro Islands, which they report as follows: Sp. gr. at 15° C., 0.8650; opt. rotation, $+42^{\circ}, 18'$; soluble in all proportions in 90 per cent. alcohol; insoluble in 80 per cent. alcohol; coefficient of saponification, 33.6; esters, calculated as linalyl acetate, 11.7 per cent.—Rep. of Roure-Bertrand Fils, October, 1909, 42.

West Indian Petitgrain Oil—Properties.—Schimmel & Co. report the following properties of a specimen of petitgrain oil of West Indian origin, distilled from leaves, which had been placed at their disposal by the Imperial Institute in London: $d_{15} 0.8531$, $n_D +43^{\circ} 36'$, acid number 1.2, ester number 6.1, soluble in 4 to 5 volumes of 90 per cent. alcohol, with slight cloudiness. These constants differ from those of the commercial oil, and besides, the odor also showed a difference, so that the oil appeared to be unsuitable for perfumery purposes.—Schimmel's Semi-An. Rep., April, 1910, 90.

Petitgrain Oil—Adulteration.—Ernest J. Parry has recently examined a number of South American petitgrain oils which proved to be adulterated with artificial esters not hitherto observed; but the reactions, in so far as they could be obtained with the limited material, pointed to the presence of tartaric acid, and it therefore seems probable that the adulterant in

question was an ethyl tartrate—probably diethyl tartrate. Two other oils, more clumsily adulterated, contained 10 and 15 per cent. respectively of oleic acid in a free state.—Chem. & Drugg., Sept. 4, 1909, 410.

Oil of Pimenta Acris Fruits—Properties.—Although the essential oil of the leaves of *Pimenta acris* is well-known as a perfume for bay rum and similar toilet articles, under the name of "West Indian bay oil" or "oil of *Myrcia acris*," and is distilled in considerable quantity in the West Indies, the essential oil of the fruits does not appear hitherto to have been prepared. Consequently, interest attaches to a recent trial distillation, at the instance of the Imperial Institute, of a parcel of the fruits from Mauritius, which yielded 3.3 per cent. of oil closely resembling the leaf oil in its properties, and having the following characters: Sp. gr. 0.9893 at 15° C.; n_D^{20} —1° 20'; solubility, 1:08 and more of alcohol, 80 per cent.; eugenol, 70 per cent.—Pharm. Journ. and Pharmacist, June 11, 1910, 727; from Bull. Imp. Inst., 1910, 8, 4.

Oil of Rhus Cotinus—Properties.—Perrier and Fouchet have distilled from the young twigs of *Rhus Cotinus* L., known in commerce as "Zante fustic," a colorless volatile oil, obtaining a yield of 0.1 per cent. The oil had a faint odor of turpentine and gave the following constants: d_{15}^{20} 0.875, n_D^{20} + 13° n_D 1.4693, acid no. 6.1, sap. no. 34.3; soluble in 70 parts of 80 per cent., 10 parts of 85 per cent., and 3 parts of 90 per cent. alcohol; miscible in any proportions with 94 per cent. alcohol.—Schimmel's Semi-An. Rep., April, 1910, 92; from Bull. Soc. Chim., iv, 5 (1909), 1074.

Otto of Rose, 1909—Characters.—Having had the opportunity to examine samples of practically all the brands of the 1909 season's otto of rose offered on the London market, John C. Umney records the results as regards odor and their physical and chemical characters in the following table, exhibiting them in accordance with his personal recognition of their odor value, checked by the opinions of an English and a French expert.

Sample.	Sp. Gr. at 30° C. 15° C.	Ref. Index at 25° C.	Melting- point.	Percentage of Alcohols calculated to C ₁₀ H ₁₆ O.	Odor-value.
1	0.861	1.4622	21°–22°	76.1	Very soft and lasting.
2	0.860	1.4636	21°–22°	73.3	Very sweet.
3	0.868	1.4630	21°	74.1	Very sweet.
4	0.860	1.4620	21°–22°	73.7	Fine.
5	0.856	1.4620	21°–22°	72.5	Not very lasting.
6	0.860	1.4640	21°–22°	75.1	Fair.
7	0.857	1.4612	21°	75.5	Strong and coarse.
8	0.860	1.4630	21°–22°	78.2	Impure.
9	0.862	1.4640	21°	78.4	

A comparison of these results with those obtained with five samples of pure otto of rose and three samples of impure oil, examined in 1896, point out that while there is an apparent rise in percentage of alcohols in the finest otto of rose, there is also an apparent adjustment of the congealing point of the impure oils to that of normal pure oils, as shown in the lower part of the present table. The three impure oils examined in 1896 had crystallizing points of 18.7° to 19.4° C.; the three unsatisfactory oils in the above table are shown to have the melting points 21° – 22° C., thus corresponding in this respect with the oils considered pure. The author accounts for this by the fact that at the present time, owing to the manufacture of stearopteneless oil, large quantities of otto of rose stearoptene are now available, and that this stearoptene, together with specially prepared hydrocarbons, is used for the sophistication of the oil. From all these and other observations, he concludes that the adulteration of otto of rose is to-day generally of a much more skilful nature than it was ten years ago, and that physical and chemical characters *alone* do not guarantee the purity of a given sample. On the other hand, perfectly pure samples may have characters very slightly outside the average of a season's otto, but so long as the odor of such otto is of the best it should not be condemned, though, if the odor is not that of a typical pure otto, it should be unhesitatingly condemned, even if apparently perfect as regards physical and chemical constants.—Chem. and Drugg., Nov. 20, 1909, 786.

Otto of Rose—Adulterants.—Ernest J. Parry, the adulteration of oil of rose is being carried on at present to a great extent, and a great deal of scientific skill is being used to produce mixtures of geraniol and allied bodies with the same physical characters as the genuine oil. He therefore thinks that the determination of the amount of alcohols present in the oil, calculated as geraniol, is the most useful test to supplement the physical characters. Genuine otto of rose rarely contains as much as 75 per cent. of alcohols, calculated as geraniol, and any figure above this must be regarded as being suspicious. Five samples of otto of this season's distillation, all of which were sold as "guaranteed pure," have all been found to be adulterated, giving the following figures on analysis :

	1	2	3	4	5
Sp. gr. at 30°	0.862	0.860	0.860	0.864	0.8595
Refraction index at 25° ..	1.4649	1.4660	1.4652	1.4670	1.4642
Optical rotation.....	-2°	$-2^{\circ} 30'$	$-2^{\circ} 30'$	$-2^{\circ} 45'$	$-2^{\circ} 20'$
Ester-value.....	9	11	8	7.5	8.8
Total alcohols.....	79.5 %	79 %	81 %	81.2 %	80 %

—Chem. & Drug., Aug., 1909, 292.

Samphire Oil—A Prospective Source of Dill-Apiol.—F. Borde has distilled an essential oil from samphire (*Crithmum maritimum*, L.), which bids fair to assume some importance as a cheap and rich raw material for

the preparation of dill-apiol, hitherto difficult to obtain, since it contains about 40 to 60 per cent. of this body. The oil in question was distilled from the plant gathered almost at the end of the flowering season. The plant contained 80 per cent. of water. The oil-yield was as follows: Of plants collected in the first half of August, leaves and stems gave 0.3 per cent., fruit, 0.7 per cent.; in the second half of August 0.15 and 0.8 per cent., and in the middle of September 0.154 and 0.7 per cent. respectively. The oil from the leaves and stalks is specifically heavier than that from the fruit; it has a deep yellow color, and an aromatic, somewhat pungent odor of the plant. The crushed fruits, however, yield a pale yellow oil, which has a pleasant odor, especially when the fruit has been air-dried. The subjoined table gives the properties of the oil from the various parts of the plant, "A" being oil from leaves and stems "B" from fruit.

	August.		About mid-September.	Total samples.		Dried fruit.
	1 st half.	2 ^d half.				
d ₄₀ (A)	1.0374	1.0519	1.0492	—	—	—
" (B)	0.9690	0.9730	0.9661	0.9809	0.9808	0.9581
a _D (A)'	8° 15'	7° 12'	6° 42'	—	—	—
" (B)'	5° 27'	6° 4'	6° 12'	5° 32'	6° 4'	8° 9'
Iodine No. (A).	189	167	153	—	—	—
" " (B).	215	201	210	192	199	174
Sap. No. (A) ..	6.4	—	—	—	—	—
" " (B) ..	10	—	—	—	4.2	—
Acet. No. (A) .	1.2	—	—	—	—	—
" " (B) .	—	—	—	—	3.5	—

In addition to the above data, the b. p. (170 to 300° C.) and the solubility in alcohol (1 : 6 of 90 per cent. alcohol) of the oil distilled from ripe and dried fruit are recorded. In the fractions boiling over 200° C., which were examined more closely by Delépine, the presence of *dill apiol* (40 to 60 per cent.) was determined, and positively identified by preparing the tribromo-compound (C₁₂H₁₈BrO₂Br₂; m. p. 110° C.), and also by converting the dill apiol into dill *iso*-apiol, m. p. 44° C.—Schimmel's Semi-An. Rep., October 1909, 108–109; from Bull. des Science Pharmacol., 16 (1909), 132 and Compt. rend., 149 (1909), 215.

From a reprint of Mr. Borde's paper, received by Schimmel & Co, the additional information becomes available that the fractions of samphire oil with low b. p. contain a terpene, b. p. 158 to 160° C., d₄₀ 0.8703, [α]_D + 44° C. 37' (very probably d-pinene), as well as another terpene boiling between 176 and 180° C. (d₄₀ 0.8957, α _D ± 0) which has not been more closely identified.—Ibid., April, 1910, 94.

Sandalwood Oil—Constants of 200 Distillates from Mysore Wood.—C. A. Hill and J. C. Umney have suggested the following constants for the monograph on sandalwood oil for the next B. P.: Specific gravity at 15.5° C., 0.973 to 0.985; optical rotation (100 Mm. tube) at 20° C., —16° to 20° C.; solubility in 70 per cent. alcohol at 20° C., 1 vol. in 6 vols. These figures are evidently based on data taken from recent laboratory records of Messrs. Stafford Allen & Sons, representing about 200 distillates from Mysore sandalwood obtained by them during a period of two years and nine months, which are given in detail in the present paper.—Chem. & Drugg., Febr. 19, 1910, 293.

Oil of Storax—Gross Adulteration.—Schimmel & Co. call attention to two storax oils, offered as "guaranteed pure," but below the market price, which on examination proved to be grossly adulterated. The *first sample* gave the following constants: $d_{15} 1.0986$, $a_D - 1^\circ 55'$, acid no. 0.5, ester no. 239.9, $n_{D20} 1.56149$; soluble in twice its vol. of 80 per cent. alcohol with slight opalescence. A detailed examination showed that the oil was simply benzyl benzoate scented with styrene, for when subjected to distillation under 4 Mm. press., they obtained between 35° and 40° C., about 5 per cent. first runnings possessing the characteristic odor of styrene, while about 90 per cent. of the total oil passed over almost uniformly at 156° to 157° C., and possessed all the constants of benzyl benzoate: $d_{15} 1.1246$, $n_{D20} 1.57000$, sol. p. + 18.1°, ester no. 262.3.

The *second sample* had the following constants: $d_{15} 0.8781$, $a_D + 19^\circ 20'$, acid no. 0.1, ester. no. 5.0, $n_{D15} 1.47760$; soluble in 5 to 6 vols. of 90 per cent. alcohol, forming a slightly cloudy solution. This differed from the first in its very low sp. gr., its refractive index also was too low, its optical rotation, on the other hand, much too high. The suspicion which was naturally aroused that in this case also the oil was adulterated, was confirmed by its behavior on boiling. By subjecting the oil to distillation a fraction amounting to 45 per cent. was obtained, which passed over under 757 Mm. at from 156° to 160° C., and which consisted of pinene ($d_{15} 0.8668$; $a_D + 21^\circ 33'$; $n_{D20} 1.47225$; m. p. of the pinene nitrobenzylamine 121.5° C.) As this hydrocarbon has not been met with in storax oils up to the present, and in any case cannot possibly occur in them to any large extent, it is quite certain from the values given above that the oil was adulterated with oil of turpentine to an almost incredible degree.—Schimmel's Semi-An. Rep., April, 1910, 101.

Vetiver Oil—Possible Production in the Philippines.—According to Bacon vetiver or cuscus grass is found in the Philippine Islands, where its roots are known to the natives as *moras* or *rais moras*. A few sample distillations from roots grown in experimental plantations gave the following result: Yield of the fresh crushed root: 1.09 per cent. of a pale yellow oil. In order to separate the water better from the oil, which has almost the

same specific gravity, petroleum was added, which was afterwards distilled off *in vacuo*. The oil possessed a strong, agreeable odor, and had the following constants: d_{40}^{200} 0.9935, a_{D30} + 32.1° C., n_{D30} 1.5212, sap. no. 47.4. Green root, not previously crushed, yielded upon distillation 0.3 per cent. of oil, dried root, uncrushed, when extracted with ligroin, gave 0.25 per cent. of oil with a very faint vetiver odor. Dried root which had been kept in sacks for 3 months, when distilled continuously by steam, with cohobation of the water, gave 0.456 per cent. of a brown oil of powerful odor, possessing the following constants: d_{40}^{200} 0.9964, a_{D30} + 32.1° C., n_{D30} 1.5163, sap. no. 6.06. The experimental distillations were conducted with material varying in quantity from 65 to 175 lbs. The yield of root per acre is stated to be about 7200 lbs. The oil-content appears to increase up to the flowering time of the grass, and it would therefore probably be desirable to harvest and distil the roots when they are not more than three months old. The plants are propagated by dividing the roots; it has not been attempted to raise them from seed. The author succeeded in detecting the presence of several acids in the vetiver oil. 100 Gm. of the last described oil yielded 19 Gm. of acid mixture whose odor reminded of fatty acid, which in turn yielded on distillation *in vacuo* 40 per cent. of a pale yellow, viscous acid, boiling at 200°–205° C. at 4 Mm. The analytical figures of this acid and of its sodium salt gave the formula $C_{15}H_{24}O_2$. Another sample of vetiver oil yielded on saponification considerable quantities of benzoic acid.—Schimmel's Semi-An. Rep., October, 1909, 126; from Philippine Journ. of Sc., 4 (1909), A, 118.

Oil of Wild Celery—Properties.—Schimmel & Co. describe an oil distilled in the south of France from the herb and seed of the wild celery (*Ache des marais*). It was of a pale yellow color, had a pronounced odor of celery, and gave the following constants: d_{15}^{20} 0.8713; a_D + 58° 30'; n_{D20}^{20} 1.47715; acid number, 1.8; ester number, 41.5. No clear solutions could be obtained even with 95 per cent. alcohol, the reason of this being that the oil, which was distilled last year, had become considerably resinified in the meantime. After rectification with steam (in the course of which process a residue of 7.7 per cent. remained) its properties had undergone considerable change: d_{15}^{20} 0.8541; a_D + 70° 55'; n_{D20}^{20} 1.47489. Soluble in 6 vols. and more of 90 per-cent. alcohol with slight turbidity.—Schimmel's Semi-An. Rep., October, 1909, 37.

Ylang-Ylang Oil—Classification of Grades and New Method of Extraction.—As the outcome of control tests made with 31 ylang-ylang oils of the first, and 22 of the second quality, Bacon confirms the classification of this oil on the basis of its constants, which he published last year (see Proceedings 1909, 333). The limits in the constants as now ascertained are as follows. First-grade oils: d_{40}^{200} 0.910 to 0.945 (mostly about 0.920 to 0.930), a_{D30} —22° to 50.8° C. (mostly —40° to 50° C.); n_{D30} 1.4863

to 1.4944; ester number, 92 to 129 (average 104); ester number after acetylation, 154 to 214 (average 182). Second-grade oils: d_{40}^{30} 0.905 to 0.925 (mostly about 0.910 to 0.915; $\alpha_{D_{30}^{30}}$ —38.5° to —79.3° C. (fluctuating very irregularly); $n_{D_{30}^{30}}$ 1.4910 to 1.5030 (mostly keeping closely to the limit values); ester number, 71 to 88 (average 81); ester number after acetylation, 96 to 141 (average 118). The author also made experiments for obtaining ylang-ylang oil by extraction with volatile solvents, among which petroleum ether gave the best results. The yield was from 0.7 to 1.0 per cent. of an oil of very dark color, containing fairly large proportions of resin. Undiluted, the oil had neither a particularly agreeable, nor even a powerful odor, but when it was much diluted the perfume of the flower was clearly apparent. It had the following constants: d_{40}^{30} 0.940; $n_{D_{30}^{30}}$ 1.4920; ester number, 135; ditto after acetylation, 208. It will be seen that these properties agree with those of first-grade distilled oils, and the slight difference in the odor of extracted oil as compared with the natural article is ascribed to the presence of small proportions of unknown compounds which are readily decomposed by heat. The extracted oil is also said to have this advantage that it cannot be imitated synthetically, and it is therefore possible that it may command much higher prices than distilled oil. When the extracted oil was shaken with water not inconsiderable quantities of resin separated out, which possessed the characteristic flower odor, while the residual oil assumed an odor of p cresol methyl ether.—Schimmel's Semi-An. Rep., October, 1909, 130; from Philippine Journ. Sc., 4 (1909), A, 127.

Ylang-Ylang Oil—Constants of a Sample from Nossi-Bé.—Roure-Bertrand Fils report the results of examination of oil of ylang-ylang distilled in the island of Nossi-Bé and believed to be pure, as follows: Sp. gr. at 15° C., 0.9673; rotation, —42° 12'; soluble in 1 vol. of 90 per cent. alcohol, with a slight violet fluorescence, later a cloudiness; acid value, 1.4; sapon. number, 129.5; sapon. number after acetylation, 154.7; esters (as linalyl acetate), 45.3 per cent.; total alcohols, 42.7 per cent.; combined alcohols, 35.6 per cent.; free alcohols, 7.1 per cent. These characters differ from those of previously examined oils from Manila and Réunion, and it is evidently inferior to those, although the inferiority may be due to the method of preparation.—Rep. of Roure-Bertrand Fils, October, 1909, 43.

Oil of Zedoary Root—Constants of a Philippine Product.—Bacon states that the plant yielding zedoary root oil, *Curcuma zedoaria*, Rosc., grows abundantly in the neighborhood of Manila. 100 kilos of the root of this shrub yielded 65 Gm. (0.065 per cent.) of oil, as well as 40 Gm. of a well crystallizing volatile solid body. The oil was deep bluish-green and possessed an agreeable odor faintly reminding of camphor. d_{40}^{30} 0.933; $n_{D_{30}^{30}}$ 1.4920; probably inactive; in any case $\alpha_{D_{30}^{30}}$ not exceeding + 1.5°;

owing to the dark color an exact reading was impossible. It dissolved readily in 2 vols. and more of 80 per cent. alcohol. When the parts with the lowest b. p. were distilled *in vacuo* the camphor-like odor, which is probably due to the presence of cineol, was lost, and its place taken by a true flower-odor. A more thorough examination of the oil is to be made later on.—Schimmel's Semi-An. Rep., October, 1909, 131; from Philippine Journ., Sc. 4 (1909), A, 132.

ALCOHOLS AND DERIVATIVES.

Alcohol and Alcoholic Beverages in the U. S. P.—M. I. Wilbert discusses the question of retaining alcoholic beverages, such as brandy, whisky and wines in the U. S. P. and what restrictions, if any, should be placed on the sale of alcohol, concluding that brandy, whiskey and *ret* wine at least should be deleted from the Pharmacopœa. This paper appears in the "Proceedings," 1909, 788–792.

Absolute Alcohol—Preparation.—W. H. Warren describes an apparatus which serves at once for boiling the alcohol to be dehydrated over the dehydrating agent, drawing off samples for determination of specific gravity during the treatment, returning them if the operation is incomplete, and distilling without first cooling when the satisfactory specific gravity is obtained. The results of experiments with the apparatus are summarized thus: (1) It is not possible to deprive commercial alcohol of all its water by boiling over lime. Dehydration takes place gradually up to a certain point, and it is useless to boil longer under return-condenser when the test-distillate contains 99.87 per cent. (2) Commercial alcohol can be brought to the point where it will give a test-distillate containing 99.87 per cent. by boiling six hours without previous standing over lime; or, by boiling five hours, after allowing the alcohol to stand for twenty-four hours over lime. (3) When the test-distillate contains 99.87 per cent., the alcohol, if distilled, will contain as a whole 99.94 per cent. The author has never succeeded in getting a distillate containing a higher percentage of alcohol than this. (4) It is possible to increase the yield of absolute alcohol by conducting the dehydration in two stages and using each time a quantity of lime only in slight excess of that theoretically required to combine with the water present. But the absolute alcohol obtained will by no means be as strong as it will be if dehydration takes place at one operation in presence of a large excess of lime.—Journ. Amer. Chem. Soc., May, 1910, 698.

Alcohol.—Rapid Determination.—D. Sidersky describes the following method for the rapid determination of alcohol, which depends on the miscibility of ether with strong alcohol: Twenty Cc. of the alcoholic liquid under examination and 10 Cc. of ether of sp. gr. 0.724, are shaken in a closed vessel; on standing, the liquids separate into two layers. Successive quantities of alcohol of 98° C. are now added from a special burette, the mixture being shaken between each addition. The ethereal-

alcoholic layer diminishes progressively, and addition of alcohol is continued until the last drop of alcohol added causes the complete disappearance of this layer. The burette employed in adding the alcohol is so graduated as to give the percentage of alcohol in the sample directly. The vessel in which the admixture is made has a very narrow neck, so that the separation of the two layers may be easily distinguished.—*Pharm. Journ. and Pharmacist*, Febr. 19, 1910, 205; from *Bull. Chim. Sucr. et Drit.*, 27 (1909), 562.

The New Alcohol Tables of the U. S. Bureau of Standards are the subject of a paper by A. B. Lyons in which after pointing out the deficiencies of the several alcohol tables given in various Pharmacopœias, he states that he has examined the five tables prepared by the Bureau of Standards, figure for figure, looking in vain for misprints or serious errors in computation, and regards them entitled to acceptance as authoritative. These tables are published with Mr. Lyons' paper in the "Proceedings," 1909, 907-918.

Ethyl Ether—Influence of Water and Alcohol on the Boiling Point.—Dr. John Wade and Horace Finnemore have experimentally studied the influence of water and alcohol on the boiling point of ethyl ether. The first part of their paper deals with the examination of ether purified by existing processes, in the course of which they discuss simple dessication with calcium chloride, lime, sodium, and phosphoric oxide. Then oxidation and dessication, and exhaustive washing and dessication are discussed. The results show that the boiling-point of pure ether is very near 34.50°C. , and its sp. gr. probably below 0.71994. The second part of the paper deals with the isolation of a binary mixture of ether and water, the investigation of a supposed binary mixture with alcohol, and the absence of a ternary mixture. The binary mixture with water boils with a remarkable constancy at 34.15° , or 0.35°C. lower than pure ether, and contains 1.38 per cent. of water, so that in the fractionating of moist ether this binary mixture commences to pass over before the pure ether, and, unless all but a trace of water is first removed, pure ether cannot be obtained from it by any process of distillation. Further, it is shown that the complete elimination of alcohol is also a necessary condition in purification. The authors find that absolutely pure ether is, like absolute chloroform, peculiarly unstable, and the investigation is being continued with a view to determining the best methods of purification.—*Chem. & Drugg.*, Dec. 4, 1909, 862; from *Journ. Chem. Soc.*, Nov., 1909.

Ether—Contamination with Vanillin.—Having occasion to examine a sample of ether which had proven unsatisfactory in its anesthetic action in six cases, K. Feist found the otherwise pure ether to contain appreciable quantities of vanillin. Speculating on the probable source of the contamination he considers it possible that the vanillin was derived from the cork stopper of the container.—*Apoth. Ztg.*, xxv (1910), No. 13, 104.

Acetic Ether—Conditions Affecting its Production and Composition.—

J. Habermann and H. Brezina have made some interesting studies concerning the conditions affecting the production and composition of acetic ether. It is usually assumed that the formation of this ether from alcohol acetic acid in the presence of sulphuric acid, as expressed by the equation $C_2H_5O + C_2H_4O_2 = C_2H_5O_2C_2H_5 + H_2O$ —is dependent on the action of sulphuric acid in removing and binding water from the reacting liquids. It therefore seemed plausible that the sulphuric acid might be replaced by some other dehydrating agent, and that this might lead to a new and more practical method for preparing acetic ether. For this purpose the authors selected anhydrous copper sulphate, mixing 160 Gm. of this with 400 Gm. of alcohol and 240 Gm. of glacial acetic acid, allowing this mixture to stand 24 hours, with frequent shaking, at the ordinary room temperature, and then subjecting it to distillation in a water-bath. After several rectifications a product was thus obtained, having the boiling-point 70° – 72° C., which approximates closely to the boiling-point 72.78° C. given by Genthner, while according to other authors acetic ether boils at 77.1° – 77.5° C. These differences are explainable by the fact that commercial acetic ether is not a pure product. The authors have been able to confirm the observations previously made by Thomson that commercial acetic ether on repeated distillation over metallic sodium will yield a relatively small proportion of ether boiling at 70° – 72° C. (which proved to be identical with the product obtained in large quantities from the mixture of copper sulphate, alcohol and glacial acetic acid) while the far greater portion had the constant boiling point 77° C. By a suitable method of distillation from calcium chloride the authors have succeeded in converting the lower boiling product (b. p. 70° – 72° C.) obtained with copper sulphate, into pure acetic ether having the boiling-point 76° – 77° C., and they conclude from this that the lower boiling fraction (70° – 72° C.) is in reality a compound of 1 mol. of acetic ether with 1 mol. of ethyl alcohol.—Pharm. Ztg., liv (1909), No. 89, 879; from Journ. f. prakt. Chem., 1909, No. 20.

Ethylene Dichloride—A Useful Solvent for Iodine in Dermatology.—Dr. A. W. Wallace finds that ethylene dichloride is far preferable to alcohol or acetone as a solvent for iodine for sterilizing the skin, since the vapors the solution gives off are quite non-irritant. The vapors of acetone solution of iodine are very pungent and irritating, and where a large area has to be painted the atmosphere of the room becomes almost intolerable, and nurses and others are troubled with lachrymation and coryza, often of an intense kind. Of all the organic fat-solvents ethylene dichloride is found to give off the least irritant vapors; in fact, even the odor of iodine is barely perceptible. It is also quite as efficient as a fat solvent as the other organic liquids. Moreover, its vapors are non-inflammable. The following is the method of skin preparation pursued: (1) Immediately—a

few minutes to one hour—before operation, swabbing with a mixture of equal parts of methylated alcohol and ethylene dichloride. (2) Swabbing with pure dichloride. (3) Painting with iodine ethylene dichloride solution 2.48 per cent., known as "I.D.E." (4) Fixing sterile lint over prepared surface. The iodine stain formed on the skin is lighter than that produced by other solvents and disappears more quickly, without producing any irritation or dermatitis.—Pharm. Journ. and Pharmacist, June 25, 1910, 787; from Brit. Med. Journ., 1910, 1, 1288.

Chloroformium Pro Narcosi—Proposed Tests of the G. P.—G. Arends enters a protest against the formaldehyde-sulphuric acid test, proposed for the new official "chloroform for narcosis" to be admitted into the forthcoming German Pharmacopœia, whereby the presence of traces of iso-amylalcohol and chlorbenzol may be detected. He regards the sulphuric acid test, which has been made more severe by demanding that concentrated sulphuric acid shall not be affected by contact with an equal volume of the chloroform during 48 hours, instead of one hour now demanded for chloroform, as answering every purpose, since chloroform that will respond favorably to this test cannot contain the impurities looked for by the formaldehyde-sulphuric acid test. Moreover, he regards the value of the latter test as being problematic, since too little is known about its reactions with other bodies, while more important tests, such as that for phosgen, which have been proposed for better reasons, are ignored in the forthcoming revision.—Pharm. Ztg., lv (1910), No. 35, 355.

Chloroform—Its Purity when Prepared from Acetone the Cause of Irregularities in Narcosis.—It has been pointed out by J. Regnault that chloroform prepared from acetone is more liable to produce irregularities in its anesthetic effect than chloroform prepared from ethyl alcohol, even though the two are apparently identical when subjected to the usual tests. Careful investigation undertaken by Wade have now demonstrated, contrary to all expectations, that of the two kinds of chloroform, that prepared from acetone was the purest; it contained only the added alcohol and traces of water, while chloroform prepared from alcohol contained besides these also 0.05 per cent. of ethyl chloride. The greater regularity in the action of the latter is attributable to the presence of ethyl chloride. It has been found that the addition of ethyl chloride in the quantity mentioned, renders the acetone chloroform equally effective, while an increase to 0.25 per cent. ethyl chloride renders it superior to alcohol chloroform.—Pharm. Ztg., liv (1909), No. 68, 662; from Ztschr. Oester. Ap.-Verein.

Salol-Chloroform—Preparation and Use in Wound Treatment.—Bourlier highly recommends "Salol-chloroform," obtained by mixing equal volumes of salol and chloroform, for the treatment of infections, wounds and the sterilization of *Laminaria* pencils. On dropping about 30 drops of the syrupy liquid upon the wound, the chloroform rapidly evaporates

and leaves the wound covered with fine, dusty salol, which produces complete asepsis. Laminaria pencils, which had been made antiseptic by immersing into salol-chloroform, gave no evidence of even traces of bacterial growth after exposure during four days to bouillon cultures. Its freedom from odor and powerful disinfectant action leads the author to prefer it to iodoform ether.—Pharm., Zentralh. 51, (1910), No. 9, 173.

Iodoform — Classification of its Compounds Recommended as Substitutes.—Dr. George Cohn in an exhaustive paper briefly reviews the many iodoform addition compounds which have been proposed as substitutes, classifying them under four principal divisions, viz., *Compounds of Iodoform*: (1) With bases such as ammonia, trimethylamine, hexamethylene tetramine, etc.; (2) with sulphur compounds—such as sulphur, iodethylethyldisulphide, triethylsulfonium iodide, etc.; (3) with sulphur and nitrogen compounds—exemplified by carbothialdin; and, (4) with albumin bodies, which, however, are probably not addition compounds, but merely mechanical admixtures in which the albumin simply modifies the odor and increases the volume of the preparation. None of these compounds appear to have satisfactorily served the purpose for which they were introduced; the correction of odor has been incomplete at best, or the undesirable odor is developed when the compounds come in contact with the wound exudation, by which they are split up into their components. Nevertheless, he considers it possible that by continued study, addition products of iodoform may be developed that will unite the therapeutic efficiency of iodoform with a stability that overcomes the objectionable odor, or that are in themselves of pronounced therapeutic value, and he has therefore reviewed the conditions under which the different compounds now proposed and supplied as substitutes of iodoform are produced, and their principal character, in the hope that he may thus encourage and assist in the further study of these interesting addition compounds. — Pharm. Zentralh., 51 (1910), No. 8, 145-50.

Iodoform—Estimation in Gauzes.—V. Paolini recommends the following method for the estimation of iodoform in gauzes: 10 Gm. of the gauze, cut into small pieces, is heated under a reflux condenser for 2 or 3 hours in an Erlenmeyer flask of 500 Cc. capacity with 40 Gm. powdered zinc and 60 Cc. of 25 per cent. sulphuric acid. Then 40-50 Cc. more of sulphuric acid are added and the heating (on a sand or water-bath) is continued several hours longer. The iodine is then completely converted into hydrogen iodide, as evidenced by the complete decoloration of the gauze. The liquid is drained off, the gauze washed with repeated quantities of water, and the whole brought to the volume of 1 liter. Of this liquid, 100 Cc. are then shaken out with carbon disulphide after the addition of potassium nitrite and the liberated iodine dissolved by the CS₂, is estimated by means of sodium thiosulphate in the well-known manner, the

quantity of iodoform in the sample being calculated from that of the iodine so ascertained.—Pharm. Ztg., lv (1909), No. 97, 957; from Monit. scientif., 1909.

Chloral.—The condensation of chloral with primary aromatic amines is described in a paper presented to the Association by Alvin S. Wheeler and S. Jordan, of the University of North Carolina, which is a continuation of work previously described by Mr. Wheeler in the Journ. of the Amer. Chem. Society. The present paper appears in the "Proceedings," 1909, 902.

Chloraloses—Definite Compounds of Chloral with Sugars.—Chloral forms a series of definite crystalline compounds with the sugars, which have been studied for some years by Hanriot. Of these the

Glucochloraloses may be taken as types; they are obtained by heating together on the water-bath 1000 Gm. of anhydrous glucose and of anhydrous chloral with 5 Cc. of fuming hydrochloric acid. Reaction takes place at about 80° C. The product, a glassy soluble mass, does not appear to contain chloraloses; but on boiling it with water these compounds are formed. The excess of chloral is removed by boiling with water, evaporating and crystallizing. The mother liquor is again freely diluted with water, boiled, evaporated, and again allowed to crystallize. In this manner *α-glucochloralose* and *para* or *β-glucochloralose* are obtained. The former $C_8H_{11}O_6Cl_3$, forms large needles from alcohol, melting at 187° C.; the latter, with the same formula, occurs in scales or prisms, melting at 227° C. Compounds and products of both are described.

Mannochloralose, $C_8H_{11}O_6Cl_3$, form small soluble scales, melting at 208° C.

Lävulochloralose is also discussed by the author and its structural formula shown. Sorbose and rhamnose do not form chloral compounds. Arabinose forms with bromal crystalline arabinobromalose, $C_7H_7O_6Br_3$, melting at 210° C.—Pharm. Journ. and Pharmacist, April 9, 1910, 455; from Compt. rend., 150 (1910), 623.

Methyl Alcohol—Question of Toxicity.—G. Arënds, after reviewing the question of the toxicity of methyl alcohol, expresses the belief that the recorded observations are not based on the effects produced by *pure* methyl alcohol, but upon the toxic effects following the consumption of the impure alcohol or crude wood spirit used for denaturing ethyl alcohol. He therefore recommends that further investigations be made with pure methyl alcohol before condemning it for making certain pharmaceutical preparations and products.—Pharm. Ztg., lv (1910), No. 48, 489-490.

Formaldehyde—Alleged Production by Boiling Solutions of Cane-sugar.—A widely quoted statement made by A. A. Ramsay about a year ago to the effect that when solutions of cane-sugar are boiled at 100° to 103° C.,

as would be the case in making jellies, etc., formaldehyde is produced in appreciable amounts, has led Charles H. LaWall to study the subject experimentally. The results of these experiments, which are described in some detail, make it obvious that cane-sugar solutions do not develop formaldehyde when boiled under ordinary conditions, but that "furfuraldehyde" is produced, which reacts in such a manner with the Hehner test—the only one employed by Ramsay—as to deceive the analyst who relies on it alone, without confirmation by the Rimini test.—*Amer. Journ. Pharm.*, August, 1909, 394-396.

Formaldehyde—Photochemical Formation in Green Plants.—S. B. Schryver contributes the results of some interesting researches on the photochemical formation of formaldehyde in green plants, which lead to a hypothesis contradicting in some directions the original conception of Baeyer. Employing a method for the determination of free as well as combined formaldehyde, available in dilutions of 1:1000000, which is described, the author found formaldehyde present in most specimens of chlorophyll examined, proving that the aldehyde exists in chlorophyll in fairly stable combination. Experiments made with chlorophyll films (obtained by evaporation of ether—solution of chlorophyll on glass strips) demonstrate that formaldehyde is formed in the sunlight, both in the presence and absence of CO_2 , but in the last case in very small quantity; while in the dark no formaldehyde is formed. It appears probable that in sunlight and the presence of CO_2 a continuous synthesis of formaldehyde takes place resulting in the constant condensation of the latter into sugars, preventing the accumulation of toxic quantities of formaldehyde.—*Pharm. Ztg.*, lv (1910), No. 39, 397; from *Proc. Royal Soc. London*, 82, 226-232.

Formaldehyde—Production by Oxidation of Ethyl-Alcohol.—By the aid of an extremely delicate reaction which is produced only in the presence of formaldehyde and permits the recognition of the latter in dilutions of 1:10000000, M. E. Voisinot has been able to detect the presence of traces of formaldehyde in pure ethyl alcohol after having subjected it to oxidation by chemical, physical or biological methods. The reaction consists in the formation of a violet color on treating an albuminoid substance with sulphuric or hydrochloric acid, containing a trace of nitric acid, in the presence of a trace of formaldehyde. The author's experiments justify him in assuming the presence of formaldehyde to be due to a secondary reaction occurring during the oxidation of the ethyl alcohol, and not to the accidental presence of methyl alcohol in the different ethyl alcohols used in the experiment.—*Pharm. Ztg.*, lv (1910), No. 38, 386; from *L'Union pharm.*, 1910, No. 4.

Formaldehyde—Testing by the Pharmaceutical Chemist.—Prof. Geo. D. Beal contributes a valuable paper on formaldehyde testing by the pharmaceutical chemist, in which he calls attention to the fact that while there are

numerous and well marked reactions for formaldehyde with other substances, not all are characteristic of this one aldehyde. The tests for formaldehyde, he says, may be divided into two groups, the one depending on oxidation, the other on condensation reactions—the latter again being subdivided into condensation with hydrazines, amines, phenols, etc. The author explains certain necessary precautions and reviews various tests that may be employed with satisfaction. He concludes that the oxidation reactions are the most reliable, and are best carried out in presence of milk, as the reaction partly depends upon the casein present. They are as delicate as the condensation reactions, and fewer bodies interfere.—*Proc. Ohio State Pharm. Assoc.*, 1909, 41-44.

Formaldehyde—Estimation.—The "Chemiker Zeitung," calling attention to the inadequacy of the usual methods for estimating the strength of formaldehyde solutions, proposes as a more reliable method that of Oscar Blank and Finkenbeiner (which depends upon the oxidation of the formaldehyde to formic acid with hydrogen dioxide in the presence of a measured quantity of normal soda solution and titration of the unconsumed alkali) and recommends that the process be conducted as follows: 3 Gm. of the formaldehyde solution are added to 25 Cc. of double normal solution of sodium hydroxide contained in a high Erlenmeyer flask; then, immediately, but gradually, 50 Cc. of pure hydrogen dioxide (2.5 to 3 per cent.) are added through a funnel, to prevent loss by spitting. After standing two or three minutes, the funnel is rinsed well with water and the unconsumed v. s. of sodium hydroxide is titrated back with double normal sulphuric acid, using litmus solution as indicator. With formaldehyde solutions of over 45 per cent., 30 Cc. of volumetric alkali must be used. In the case of solutions of less than 30 per cent. formaldehyde, the reaction should be allowed to go on for 10 minutes after the addition of the hydrogen dioxide.—*Pharm. Ztg.*, liv (1909), No. 64, 624; from *Chem. Ztg.*, 1909, No. 85.

Formaldehyde—Colorimetric Method of Estimation.—P. Dobriner and A. Oswald have devised a colorimetric method for the estimation of formaldehyde, which depends on the inverse application of the well-known reaction of morphine with formaldehyde-sulphuric acid—the formaldehyde vapor being passed into a solution of morphine in pure concentrated sulphuric acid and developing an intensely blue color which is visible with dilutions of formaldehyde of 1:250,000. The qualitative test is carried out by placing the substance or liquid under examination into a small dish, placing a small watch-glass containing the morphine-sulphuric acid solution over it, and covering the dish with another dish, inverted. The quantitative test depends on the time required for the reaction, the intensity of color, and comparison with known quantities of formaldehyde subjected simultaneously to the same test.—*Pharm. Ztg.*, liv (1909), No. 65, 633; from *Ztschr. f. anal. Chem.*, 1909, No. 9.

Formaldehyde—Determination in Presence of Acetaldehyde.—M. Deniges finds that formaldehyde may be detected in the presence of acetaldehyde by means of rosaniline bisulphite. If 5 Cc. of a solution of the latter (strength not given?) are added to a mixture of 5 Cc. of a 2 per cent. solution of acetaldehyde and 1–2 Cc. of sulphuric acid (sp. gr. 1.66), the mixture exhibits no particular change—at most a faint blue color, gradually diminishing. But if in place of acetaldehyde, formaldehyde or one of its mixtures be used, an intense violet coloration results, which is distinct even in the presence of $\frac{1}{10}$ Mgm. of formaldehyde in the fluid under examination. In this way the process of 0.01 per cent. of formaldehyde in acetaldehyde may easily be determined.—Pharm. Ztg., liv (1910), No. 38, 386; from Compt. rend., 1910, Febr. 28.

Formaldehyde—Determination in Formaldehyde Pastilles.—Domenico Cirelli recommends a method of determining the formaldehyde in formaldehyde pastilles, which depends on the depolymerization of the triformaldehyde contained in them by warming and conversion of the formaldehyde into hexamethylenetetramine by means of ammonia. The depolymerization results if 0.2–0.4 Gm. of the triformaldehyde are heated in a tubulated retort in the presence of a little water. The liberated formaldehyde is passed successively through a flask containing 8 Cc. of ammonia, a Pélégot-tube containing 2 Cc. of ammonia, and another containing 2 Cc. diluted hydrochloric acid, water vapor being conducted through the apparatus for half an hour after the volatilization of the triformaldehyde. The contents of the three receivers are then mixed, 8 Cc. of diluted HCl are added, and titrated.—Pharm. Ztg., lv (1910), No. 28, 283; from N. Chem. Zentralbl., 1910, No. 9.

Formaldehyde—Determination in its Saponaceous Compounds.—O. Allemann after comparative experiments with different methods for the determination of formaldehyde, recommends the following as being best adapted for its determination in its saponaceous compounds, such as lysoform, formpsapol, and morbizid: 50 Cc. of the solution are diluted with 4 to 5 times the volume of water (in the case of "morbizid" with 20 times the volume), and the precipitant (sulphuric acid or barium chloride) is added from a burette in slight excess. The liquid is then diluted with water to 300 Cc., the precipitate allowed to subside, the liquid filtered, and the filtrate titrated directly for formaldehyde by the iodometric method. For this purpose, 5 Cc. of the solution are mixed with 40 Cc. $\frac{N}{10}$ iodine solution, strong NaOH solution is added, drop by drop, until the color turns to light yellow, and the mixture is set aside for 10 minutes. It is then acidulated with H_2SO_4 or HCl, and the unconsumed iodine titrated with $\frac{N}{10}$ thiosulphate solution. Pharm. Ztg., lv (1910), No. 28, 283; from Ztschr. f. anal. Chem., 1910, 265–269.

Amyl Alcohol—Detection in Alcoholic Beverages.—H. Holländer recom-

mends the following method for the detection of amyl alcohol in alcoholic beverages: Twenty-five Cc. of the beverage to be tested are treated with 1 Cc. of normal potash solution, and placed in a distillation flask. After distilling the whole of the liquid, 5 Cc. of the distillate is mixed with an equal quantity of concentrated acetic acid, and the mixture boiled for about a minute. One drop of pure phenylhydrazine is added, the clear liquid again boiled, and then cooled in ice or running water, and allowed to rest at room temperature. On under-layering this solution with strong hydrochloric acid, there occurs a distinct green or emerald-green ring. Above this ring there sometimes occurs a brown coloration, but this is of no importance.—Pharm. Journ. and Pharmacist, May 21, 1910, 645; from Münch. Med. Wschr., 1910, 83.

Amyl Alcohol—Color-Reaction with α -Naphthol.—In the course of a study of the color-reaction of ordinary urine with solutions of α -naphthol, H. v. Wyss, E. Herzfeld and O. Rewidzow found that the same reagent applied to pure amyl alcohol in the same way produced an intensely blue-violet coloration—4 drops of the reagent being added to 2 Cc. of the pure amyl alcohol, and three differently prepared reagents used—viz.: (1) 4.5 Gm. α -naphthol in 100 Cc. absolute alcohol and Na_2CO_3 ; (2) 4.5 Gm. in 100 Cc. of water and H_2O_2 ; (3) a 3 per cent. solution of α -naphthol. The second reagent, containing H_2O_2 , is excluded. The reaction occurs quite as well when air is excluded. With isobutyl alcohol the reaction is only one-fourth as strong and it is still less with ethyl and cetyl alcohol, with glycerin and wax; while methyl and propyl alcohol, cane sugar, inosite, methyl acetate, acetic ether, acetone, benzol, petroleum ether, toluol, xylol, chloroform, fatty acids and uric acid give no reaction at all.—Pharm. Ztg., lv, (1910), No. 38, 387; from Ztschr. f. physiol. Chem., 64, 479–480.

Azomethane—Formation and Characters.—J. Thiele describes azomethane, $\text{CH}_3\text{N}_2\text{CH}_3$, which he obtained by oxidation of hydrozomethane with potassium chromate. Azomethane is a colorless, non-alkaline gas, boiling point 1.5°C ., having a faint yellowish color when liquefied, and congealing at below -78°C . to form colorless leaflets. It is readily soluble in water. If decomposed by heat, after previously diluting the gas with carbon dioxide so as to avoid explosion, azomethane splits up essentially into nitrogen and ethane, only small quantities of ethylene and methane being formed, probably according to the following equations: $\text{CH}_3\text{N}_2\text{CH}_3 = \text{N}_2 + 2\text{CH}_3$; $2\text{CH}_3 = \text{C}_2\text{H}_6$; $2\text{CH}_3 = \text{CH}_2 + \text{CH}_4$; and $2\text{CH}_3 = \text{C}_2\text{H}_4$. If, however, the azomethane is exploded by the electric spark, the formation of ethane is very materially reduced—hydrogen, ethylene and methane being formed abundantly instead. Acetylene could not be observed.—Apoth. Ztg., xxiv (1909), No. 58, 530; from Ber. d. D. Chem. Ges., 42 (1909), 2575.

Phenol—Cause of Red Color.—Gehe & Co. mention that according to recent investigation the red coloration of carbolic acid is due to the oxidation of minute quantities of the phenol into quinone, which dissolves in the phenol with a red color. Other products of oxidation of pure phenol are said to be pyrocatechin and phenoquinone.—Pharm. Ztg., lv (1910); No. 32, 325.

Liquefied Phenol—Use of Alcohol Instead of Water.—"H. R." suggests the liquefaction of phenol by means of alcohol instead of water. So prepared, it never freezes, is not liable to turn red, and is well adapted for oily dilutions and mixtures with volatile oils. The alcohol (1:5) in no way interferes with its use in wound treatment, since for this purpose it is always strongly diluted with water.—Pharm. Ztg., lv (1910), No. 21, 213.

Phenyl Salicylate—Liquefaction of Mixtures with Other Substances.—R. J. Wotring has made a study of liquefaction of mixtures of salol with other substances, with results as follows:

With Menthol: 1 mol. salol to 3 mol. menthol, or 3 mol. salol to 2 mol. menthol, produce dry powders on admixture; but 2 mol. salol to 3 mol. menthol produces a damp powder, and equal molecules of each a liquid.

With Camphor: In different proportions salol and camphor produce either pasty masses or liquids.

With Phenacetin, Antipyrine, or Salicylic Acid: These with salol alone produce dry powders, but the addition of a small amount of camphor to either mixture causes liquefaction.

With Thymol: 3 mol. salol to 1 mol. thymol, or 1 mol. salol to 3 mol. thymol, form pasty mixtures; in other proportions they liquefy.

With Chloral Hydrate: 1 or 3 mol. salol to 2 mol. chloral hydrate form moist powders; in other proportions dry mixtures result.

With Resorcinol: Dry powders result when salol and resorcinol are mixed in different proportions.

With Acetanilide: The same as with resorcinol, but addition of antipyrin to the mixture causes liquefaction.

With Beta Naphthol, Pyrogallol, or Sodium Salicylate: Dry mixtures result when either of these are mixed with salol.

With Antipyrine and Resorcinol: While dry mixtures with salol are obtained by either of these, if all three are mixed a pasty mass results.—Amer. Journ. Pharm., May, 1910, 241.

Guaiacolsulphonic Acid—New Salts.—A. Tagliarini has prepared and describes three new salts of guaiacolsulphonic acid, namely those of phenocoll, euquinine, and phenetidin.

Phenocoll Guaiacolsulphonate is obtained by mixing molecular quantities of phenocoll in ethereal solution and of guaiacolsulphonic acid in concentrated alcoholic solution. It forms a reddish-white powder, m. p. 183° C.,

sparingly soluble in water, soluble in alcohol, insoluble in ether. The aqueous solution is colored dark brown by chromic acid, brown by bromine water, blue-green by ferric chloride.

Euquinine Guaiacolsulphonate is obtained by double decomposition of basic euquinine sulphate with barium guaiacolsulphonate. The salt obtained has a dirty white color, a bitter taste and melts at $84^{\circ}\text{C}.$, soluble in water and in alcohol; sparingly soluble in ether. Alkalies precipitate euquinine from its aqueous solution, which is colored blue-green by ferric chloride.

Phenetidin Guaiacolsulphonate is obtained by the admixture of molecular quantities of its components in ethereal solution, forming a flocculent reddish-grey precipitate melting at 186° – $188^{\circ}\text{C}.$ Its solubility is like that of the euquinine salt. The aqueous solution gives a blue-green color with ferric chloride, changing immediately to violet.—Pharm. Ztg., liv (1909), No. 73, 715; from Nouv. Remèdes 1909, No. 10.

Cresotinic and Toluic Acids—Pharmacologic Distinctions.—While cresotinic and toluic acids are nearly related to each other chemically, and both related to salicylic acid, Dr. R. May finds them to differ essentially in their pharmacological action.

Cresotinic Acids (ortho-, meta-, and para-) resemble salicylic acid in their action as antiferments, as bactericides, as antipyretics, and as specifics in acute rheumatism. Their toxic effect in animals is about the same, but ortho-cresotinic acid is more depressing to the circulation.

Toluic Acid, on the other hand, in spite of its close relation to the cresotinic acids and to salicylic acid, does not seem to have any antipyretic action, as a dose of 20 grains given in a case of phthisis pulmonalis did not affect the temperature. Moreover, it differs greatly from both the other acids in its action, which does not promise for the drug any therapeutic application.—Pharm. Journ. and Pharmacist, Sept. 25, 1909, 393; from Brit. Med. Journ., Sept. 18, 1909, 791.

Benzidine—Paradiamino-diphenyl—Simplification of Use for the Detection of Blood.—Walter finds that the use of H_2O_2 in the method ordinarily employed for the detection of blood by means of benzidine, may be avoided by using tablets containing 0.1 Gm. benzidine and 0.1 Gm. sodium perborate. In use, one of these tablets is dissolved in 10 Cc. of glacial acetic acid. A few drops of the reagent so prepared produce almost instantaneously a green-blue color on a spot containing blood, or when the blood is in solution, admixture of the same with an equal volume of the reagent will have the same result. The tablets are stable and form with the prescribed quantity of acid a light brownish solution, which is available for the recognition of blood in dilutions of 1:100000.—Pharm. Ztg., lv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

Resorcinol—Characteristic Reaction.—Voley-Boucher and J. Girard describe a characteristic reaction of resorcinol, which depends on the properties of its aqueous solution to develop a beautiful green fluorescence with copper sulphate and potassium cyanide. To a few cubic centimeters of the neutral or at most faintly acid resorcinol solution several drops of 10 per cent. copper sulphate solution are added, followed by the same quantity of 10 per cent. potassium cyanide, the mixture is shaken and diluted with water until the originally red color assumes a yellowish-red tint. This then is characterized by the green fluorescence, which is distinct in solutions containing as little as 0.1 Gm. of resorcinol in 1 liter. It is important to note, however, that if the resorcinol solution is added to the mixtures of copper sulphate and potassium cyanide, no fluorescence is developed.—Pharm. Ztg., liv (1909), No. 97, 957; from Journ. de Pharm. d'Anvers, 1909, No. 20.

Glycerin—Tests Suggested for the U. S. P.—Thomas M. Starkie, basing his criticism on experience over a great many years in the glycerin business, says that many of the tests set forth in the Pharmacopœia are indefinite and unreliable, and allow of so much possibility of contention, particularly by some pedantic analyst, that any glycerin could be claimed as failing to meet the requirements of the Pharmacopœia. The requirements should be such as will avoid any possibility of advantage to any dishonest refiner by reason of tests that permit of any controversy or contention as to the meaning thereof, such as taste and odor tests, for example, which should be eliminated. Giving in each case a description of carrying out the test, the author submits the following as covering all reasonable requirements for establishing the purity of glycerin: (1) *Specific gravity*, not less than 1.294 at 25° C. (= 95 per cent. glycerin). (2) *Carbonaceous matter*, including mineral and carbonized impurities, not to exceed 0.01 per cent. (3) *Ash*, including chlorides, not to exceed 0.007 per cent. (4) *Chlorides*, not to exceed 0.001 per cent., figured as NaCl. (5) *Total acid equivalent*, in terms of NaOH, not to exceed 0.02 per cent. (6) *Arsenic* (by the Gutzeit test), not to exceed 1 part in 100,000. (7) *Silver nitrate test*, to show limit of chlorides and impurities having reducing properties. Glycerin conforming to these tests, as described by the author, will, in his opinion, insure such purity as is necessary and desirable for either food or medicine.—Amer. Journ. Pharm., June, 1910, 253-256.

Glycerin—New Method for Identification.—Denigès describes a new method for determining the presence of glycerin, which depends upon its conversion into dioxyacetone by heating it with bromine water on the water-bath, and identification of the dioxyacetone by a series of reactions with a number of bodies, such as codeine, resorcinol, thymol and β -naphthol. These, dissolved in concentrated sulphuric acid, give characteristic color reactions with dioxyacetone, partly at the ordinary temperature and

partly by the aid of heat; among these and others, which are described by the author, the reaction with codeine is the most suitable for very small quantities of glycerin. It gives a beautiful greenish-blue with strong red fluorescence.—Pharm. Ztg., liv (1909), No. 68, 662; from Compt. rend., 148 (1909), 570.

FIXED OILS AND FATS.

Fixed Oils—Comparative Value of Different Halogen-Absorption Methods.—John Stewart Remington and Harold Lancaster record the results of a comparative examination of the value of various methods which have been adopted for fixing the halogen absorption of oils and fats, in which they have compared in particular the results obtained by the Wijs and Hanus *iodine method* with those given by Hübl. and all of these in turn with the *bromine absorption* method recently proposed by McIlheney. They find that better results are obtained by the Wijs than by the Hanus or Hübl methods, but that none of the iodine methods are so rapid as the bromine process of McIlheney, which is practically instantaneous. Moreover, a standard bromine solution is easily prepared, will not change or deteriorate on keeping, and is inexpensive—conditions which point out a preference to any of the iodine methods.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 337-343.

Fixed Oils—Origin of Odor.—According to Tsujimoto's researches the peculiar odor of oils, apart from the presence of impurities, may be due to free volatile fatty acids or to decomposition products of glycerides. The odor is difficult to remove permanently, since free fatty acids are formed even in the purest oils. Linseed and sesame oils prepared from fresh seed and treated at 100° C. with 10 per cent. of Fuller's earth, neutralized with alcoholic potash and washed with alcohol, are at first practically odorless. After being exposed to diffused daylight for several days they acquire a characteristic odor. The intensity of the odor of an oil is almost proportional to its iodine value, and apparently depends on the amount of non-saturated fatty acids present. These oils are also those which are most readily oxidized. The odor of marine animal oils is partly due to volatile bases. These oils also contain non-saturated fatty acids of the series $C_nH_{2n-2}O_2$, notably clupanodonic acid, which has been isolated from cod-liver oils. The glycerides of these acids are easily oxidized and form odorous bodies of aldehyde nature. It is noteworthy that Hébert has found the glyceride of isanic acid in isano oil, which has a fishy odor. Clupanodonic acid from Japanese cod-liver oil has a very marked fishy smell, and the fatty acids remaining after its removal are almost odorless. Marine animal oils cannot be rendered perfectly odorless as long as they contain these glycerides; these must be entirely removed or transformed into odorless products by chemical means.—Pharm. Journ. and Pharmacist, Sept. 11, 1909, 342; from Chem. Rev., Fett, Harz, 1909, 85, through Nouv. Remèdes, 26 (1909), 348.

Transvaal Fixed Oils—Examination of Several Kinds.—E. M. Holmes notes the results obtained by an examination of a number of fixed oils from the Transvaal by C. T. Bennett, which included castor, linseed, ground nut, and sunflower seed oil, and are reported by J. C. Umney as follows: The oils were turbid and dirty when received, but were allowed to clarify by settling. The castor oil was dark in color, and would require bleaching unless used for cattle or for industrial purposes. They afforded the following constants:

	Specific Gravity.	Saponification Number.	Iodine Number.	Refractive Index.
Castor oil	0.964	182.8	85.7	1.4812
Ground nut	0.921	189.6	88.2	1.4722
Linseed	0.933	192.3	173.8	1.4835
Sunflower	0.932	187.5	114.2	1.4780

—Pharm. Journ. and Pharmacist, Jan. 15, 1910, 50.

Edible Oils—Detection of Oils Extracted by Carbon Disulphide.—M. Curson published the following method by which the adulteration of edible oils with oils extracted by carbon disulphide, although not of frequent occurrence, may be detected: About 200 Gm. of the oil to be tested is weighed into a flask along with 50 Gm. of 90 per-cent. alcohol; after vigorously shaking the mixture, the flask is attached to a condenser, and distillation conducted gently on a water-bath. The distillate is collected in a small receiver immersed in cold water and containing a few Cc. of alcohol in which a little potassium hydroxide is dissolved. The traces of carbon disulphide carried over in the distillate, form, with the alkali, potassium xanthate. The distillation is stopped when about one-third of the alcohol has distilled over. To the distillate is added, by drops, sufficient acetic acid to render the liquid just slightly acid, and then a few drops of an alcoholic solution of copper acetate. If potassium xanthate has been formed in the receiver, there is formed at first a yellow coloration and then, shortly afterwards, a precipitate of copper xanthate, of the same color. If the oil examined contains no adulteration of the kind referred to there is no coloration produced.—Pharm. Journ. and Pharmacist, Oct. 9, 1909, 451; from *Annal. des Falsificat.*, Sept., 1909, 409.

Fats—Effect of Exposure to Cold.—H. Wagner and T. Bohrisch have studied the effect of cold upon fats, with particular consideration of the chemical changes possibly resulting from exposure to freezing temperatures. As a result of their studies they find that such exposure is practically without effect upon the chemical constants of fats, the changes oc-

curing at freezing temperatures being quite insignificant and purely of a physical nature.—Pharm. Ztg., liv (1909) No. 102, 1005; from Ztschr. f. Nahr. u. Genussm., 1909, No. 18.

Fixed Oils—Influence of Temperature on their Stability.—A series of experiments on the preservation of olive and almond oils at different temperatures and in different kinds of containers led L. E. Walbaum to the conclusion that in cold countries in which the temperature does not ordinarily exceed 20° – 25° C., there is so little increase in the acid number, that these temperatures may be regarded as being without unfavorable influence upon them. Nevertheless, it is advisable to preserve them at the lowest practicable temperature, if possible in the ice-cellar. As to containers, it appears to be immaterial whether this is of glass or of tinned iron, but wooden containers should be avoided—possibly on account of the enclosure of air in the porous material. At temperatures of 37° to 58° C., the increase of acidity is very decided, the reaction at 58° C. probably occurring in three distinct phases, of which the second is the most pronounced and rapid.—Pharm. Ztg., liv (1909), No. 93, 919.

Fats—Practical Application of the Twitchell Process of Decomposition and the Recovery of Glycerin.—W. J. Warner gives a highly interesting account of the practical advantage of the Twitchell process of fat decomposition as applied to refining of glycerin and soap making, as carried out in a plant handling 50,000 lbs. of fat per day—a day, as he graphically explains, of 24 hours, without lunch hours, seven such days to the week, and 52 weeks to the year, one shift of employees relieving the other without any interruption of work from the beginning to the end of the year, and into the next. He says that the Twitchell process of distillation has superseded all others in the candle trade, and is being more extensively used by the soap manufacturers who have recognized the advantage of the process for the recovery of glycerin, in that 95 per cent. of all the glycerin in the fat can be obtained as C. P. This will give yield from: good tallow, 9 to 10 per cent. absolute glycerin; cocoanut oil, 12 to 13 per cent., cotton oil, 10 per cent. (approximate), grease and poor tallow, 6 to 8 per cent. absolute glycerin. The “sweet water” to be evaporated contains 15 per cent. glycerin instead of from 2 to 4 per cent. as in spent lye, and therefore only about 25 per cent. as much water has to be evaporated to make crude glycerin. The paper, which will well repay perusal—concludes with numerous analytical data obtained with different fats and oils, and of their products obtained by different processes.—Amer. Journ. Pharm., Febr., 1910, 71–80.

Expressed Oil of Black Mustard—Economic Value.—Schaumann breaks a lance for the fixed oil of black mustard seed, which is well suited for a variety of uses both pharmaceutically, as a food oil, and for technical purposes. It is susceptible of purification, so as to replace the

oils commonly used for food and as salad dressings, and in its purified condition, deprived of its objectionable color, it possesses certain advantages over the oils now official in the pharmacopœia—taking up a much larger proportion of water, for example, and well replacing them in many of the preparations, such as rosewater ointment, medicinal soaps, spiritus saponatus, ol. hyoscyam. infus., etc., etc. In fact, on the ground of its superiority, he considers it desirable to admit mustard oil into the next German pharmacopœia. Its purification is readily effected, so as to yield a colorless and practically tasteless oil, together with a lubricating oil as a by product. The chemical examination of the crude-, the purified-, and the lubricating oil yielded the following constants :

	Mustard Oil.		
	Crude.	Purified.	Lubricating.
Specific gravity.....	0.9156	0.9154	0.9161
Optical refraction	63 at 35°	63 at 35°	62 at 35°
Saponification number	175.94	181.02	178.5
Acid number.....	6.96	6.96	6.67
Ester number	168.98	175.06	171.83
Iodine number.....	116.8	125.5	121.13

These figures apply to an oil expressed from seeds designated as "Sem. Sinapis Holland. Nigr."—Pharm. Ztg., lv (1910), No. 16, 160.

Borneo Tallow—Source and Uses.—According to C. Beadle and H. P. Stevens, borneo tallow, which may be obtained from the nuts of *Shorea gysbertina*, *S. stenoptera*, *S. aptera*, *Hopea aspera*, *Isoptera borneensis*, etc., is eminently adapted for candle making, soap making, and as an ordinary burning oil without smoke. The amount of oil obtained on pressing the nuts varies from about 40 to 60 per cent. Most of the borneo tallow exported from Sarawak appears to go to Antwerp, but ten times the amount now collected could be obtained by systematic treatment.—Chem. News, Oct. 8, 1909, 173.

Cacao Butter—A Skilfully Prepared Substitute.—W. B. Cowie and B. M. Brander have during the past year examined two cacao-butter substitutes, one of which was so skilfully prepared that it answered most of the tests for genuine cacao butter, whilst the other might have been rejected on any single test. The latter, which is designated as "soft," had a low acid and iodine value and abnormally high saponification and Reichert-Meissel values. But neither of them responded to the Björklund ether test for genuine cacao butter, the "hard" kind, having also a higher melting point (36°–37° C.) instead of the "hard," skilfully prepared substitute forming a flaky deposit when the ether solution was exposed for 3 minutes to 0° C., not clearing until 15° C., while the "soft" kind, though forming only a slight deposit at 0° C., was still cloudy at 21° C. The latter evidently consists of coco-nut stearin, but it is difficult to say what the chief components

of the "hard" kind are.—Trans. Brit. Pharm. Conf. (Year-book of Pharmacy), 1909, 321-323.

Fish Oils—Detection in Vegetable Oils.—O. Eisenschimmel and H. N. Copthorne suggest the following test for fish oils of any kind in admixture with vegetable oils or similar products: 100 drops of the oil are dissolved in 3 Cc. of chloroform and 3 Cc. of glacial acetic acid. Bromine is added slowly drop by drop until the brown coloration remains, and after about ten minutes the test tubes are placed in boiling water. All vegetable oils clear up, while fish oils remain cloudy. By filtering and weighing the precipitate formed it is possible to obtain objective results. In case of boiled oils it is necessary to remove the metallic salts before adding the bromine. Fish oils that have been heated to 260° C. or more for some time will not respond to this test.—Pharm. Journ. and Pharmacist, May 14, 1910, 609; from Journ. Ind. and Engineer. Chem., ii, No. 2.

Goose Fat—Characters and Constants.—Having occasion to test some goose fat, Joseph L. Mayer was surprised at the paucity of information concerning the physical and chemical constants of this fat in the pharmaceutical literature. He has therefore made a determination of those in goose fat of his own rendering with results which, briefly stated, are as follows: *Color*, golden yellow; *odor*, characteristic; *specific gravity*, (100° C./ 15° C.), 0.8691; (40° C./ 15° C.), 0.8987; *melting-point*, 14.5° C.; *refractive index*, 40° C., 1.4594; *free acids* (as oleic), 0.209 per cent.; *acid degree*, 0.741; *acid value*, 0.413; *iodine number* (Hanus method), 72.66; *saponification value*, 191.0; *saponification equivalent*, 291.8; *Reichert-Meißl number*, 0.385; *Hehner value*, 94.43; *Maumené number*, 33.75; *specific temperature reaction*, 76.7; *Valenta's test*, 98° C. On adding 2 drops H_2SO_4 to 20 drops of fat, a greenish-yellow color is produced, changing to reddish-brown on stirring. Constants of the fatty acids are also given.—Drugg. Circ., March, 1910, 106.

Lard—Definitions.—Although the U. S. P. defines lard to be "the prepared internal fat of the abdomen of the hog (*Sus scrofa*, var. *domesticus*, Gray), purified by washing, melting, and straining," Azor Thurston says that "Leaf Lard," prepared from this leaf fat, is practically an article unknown in commerce. He says that under "Standard of Purity of Food Products" (Circ. No. 19, U. S. Dept. Agr.), lard, leaf lard, and neutral lard are defined as follows:

Lard is the rendered fresh fat from hogs in good health at the time of slaughter, is clean, free from rancidity, and contains, necessarily incorporated in the process of rendering, not more than one (1) per cent. of substances other than fatty acids and fat.

Leaf lard is lard rendered at moderately high temperatures from the internal fat of the abdomen of the hog, excluding that adherent to the intestines, and has an iodine number not greater than sixty (60).

Neutral lard is lard rendered at low temperatures.

As a matter of fact, what is sold as pure leaf lard is generally rendered from trimmings made in cutting the pork for packing and the fat adherent to the intestines, and is rendered either in closed steam tanks or open steam-jacketed kettles—the latter yielding the better, because drier, lard. Attention is called to the impurities which may be looked for and found in commercial lard, its adulteration and adulterants, and the tests considered to be generally sufficient to determine the purity of lard, which must be consulted in the original paper published in Merck's Rep., March, 1910, 64-65.

Ostrich Fat—Uses and Characters.—According to J. Vamvahas, the natives of Barbary prepare a fat from the ostrich, which they regard as a valuable remedy for rheumatism. Crushed ostrich bones and pieces of fat are boiled with water and the floating grease removed from the surface after cooling. The fat thus obtained separates on standing, at a temperature of about 28° C., into two distinct layers, the upper one liquid, the lower one solid. The liquid portion had the specific gravity 0.9255; critical temperature of solution in alcohol, 70° C.; Maumené index, 48° C.; melting-point, 8° C.; solidifying point, 2° C.; titer number, 49° C.; solidifying point of fatty acids, 35.5° C.; refraction index + 23; Reichert-Meissl value, 7.6; Koettstorfer value, 211; Hehner value, 90.37; Huebl value, 71.12. The solid layer melted at 45° C., and solidified at 31° C. Its refraction index was + 30.—Pharm. Journ. and Pharmacist, May 7, 1910, 571; from Annales Chem. Analyst., 15 (1910), 64.

Poppy-Seed Oil—Commercial Distinctions and Characters.—L. Vuafart says that, although at the International Congress at Geneva poppy-seed oil, "huile d'œillette," was defined as the oil of the seeds of the black poppy, this definition requires modification. Two varieties of poppy-seed oil are met with in European commerce, known as "œillette" and "pavot" oil respectively. Both are derived from seeds of varieties of *Papaver somniferum*. "Huile d'œillette" is obtained solely from poppies grown in Europe, with gray or blue seeds. It is more esteemed and has a higher commercial value than "pavot" oil, and is used extensively for dietetic purposes. "Huile de pavot," on the other hand, is derived from exotic poppy seeds, and has lower value. One of the chief points of distinction is the taste. "œillette" oil is sweet and nutty, "pavot" oil is stronger in flavor and somewhat acrid. "œillette" oil is described as being "fatter" on the palate, giving the impression of greater viscosity, which is not, however, confirmed by the physical test. It forms a much more permanent froth on agitation than "pavot" oil, and on passing a current of air through the two oils "pavot" oil gives no froth, while "œillette" oil froths strongly. The latter, too, is bright yellow in color, the tint of "pavot" oil being only half this intensity. Ordinary physico-

chemical "constants" show no great difference between the two oils, the specific gravity of "œillette" oil, 0.926 to 0.924, being but very slightly greater than 0.923, the specific gravity of "pavot" oil. The flavor and frothing test serve to distinguish the two kinds of poppy-seed oil.—Pharm. Journ. and Pharmacist, July 17, 1909; from *Annales des Falsifications*, 1909, 2, 276.

Phytosterins—Characters and Occurrence in Some Fixed Oils.—At the suggestion of Professor Schaer, Hermann Scherer has carried out some interesting experiments on the phytosterins and several fixed oils. He finds that the familiar reactions of the phytosterins are not applicable to their microchemical determination in the plant-cell. Both cholesterol and phytosterin are readily dissolved in solutions of chloral alcoholate, but with much greater difficulty in chloral hydrate. Nevertheless, there exist differences of solubilities in the latter which may possibly serve as the basis of a method for their separation. The author finds in the unsaponifiable portion of the *coffee-seed oil*, consisting principally of an indifferent, brown, resin-like body, a phytosterin which must be regarded as being identical with Hess's phytosterin, and that the unsaponifiable fraction of *Paranut oil*, consisting principally of an amorphous yellow body, also contains the same phytosterin, and besides this an alcohol, m. p. 180° C., which cannot be regarded as being a member of the phytosterin group of bodies. Incidentally, it is mentioned that the fixed oils of *fennel* and *anise* are qualitatively identical, but exist in different quantities, while the fixed oil of *caraway*, in analogy to the volatile oils of these fruits, shows marked differences from those of fennel and anise.—Pharm. Ztg., liv (1909), No. 98, 969; from the author's inaugural dissertation, Strassburg, 1909.

CARBOHYDRATES.

Viscose—Improved Method of Preparation.—F. Todtenhaupt states that the method of preparation of cellulose xanthogenate, better known as viscose, has remained practically the same since it was first introduced; it consists of treating cellulose with caustic alkali, whereby alkali-cellulose is obtained, and then submitting this to the action of carbon disulphide. The usual mode of procedure gives a good result with cellulose in short fibers, such as sulphite wood-pulp, but with long fibers like those of cotton wool, the difficulty of stirring thoroughly leads to particles of alkali-cellulose remaining unchanged, and it is somewhat troublesome and costly to remove these afterwards. It is now found that by diluting the carbon disulphide with a liquid which does not decompose either alkali-cellulose or viscose, the reaction proceeds to completion without the necessity of stirring. Benzin, ligroin, carbon tetrachloride, and similar liquids may be used, and by the choice of diluent and of degree of dilution the time required for the reaction may be made more or less, so that it is possible to stop it when only the outer layer of cellulose is converted, or to allow

the change to proceed to the end.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 671; from Chem. Ztg., Oct. 30, 1909, 1149.

Starch—Digestion by Infants.—The general conclusions of Dr. E. Cantley, derived from his observations, afford physiological and chemical support of the empirical use of starch in infant feeding and are briefly summed up as follows: 1. A diastasic ferment is secreted by the salivary glands and pancreas of new-born infants, and even before birth. 2. Its amount and activity are slight in the first few weeks of life and after that rapidly increase. 3. The glands, notably the pancreas, can be trained by means of a starchy diet to the secretion of an increased amount of the amylolytic ferment. There is no inherent reason why this training should not be begun shortly after birth in the case of the bottle-fed infants, instead of waiting until the child has attained the age of six months, as so commonly advised on purely theoretical grounds. 4. Practical experience has shown that the usual barley water contains about 2 per cent. of starch. If mixed with an equal quantity of milk there will be only 1 per cent. of starch in the mixture. Such an amount is non-injurious and almost certainly beneficial, for it encourages the growth of lactic acid bacilli and the formation of lactic acid. These organisms are of undoubted advantage, in the prevention of the growth of proteolytic bacteria. 5. If a starchy food is used in the first few weeks of life it is advisable to begin with a milk mixture which will not contain more than 0.5 per cent. of starch, and to gradually increase the amount as the child gets older. Indeed, at any age when a starchy food is first given it should be in a very weak solution and slowly strengthened up to as much as 3 to 5 per cent. If the stools become very acid, or they give a distinct starch reaction, the percentage of starch in the diet must be reduced. 6. Special care must be paid to these considerations in the first two months of life because of the deficiency of salivary secretion. Further investigations may possibly show that this is a point of little importance, as the pancreatic secretion may be sufficient in quantity and activity. 7. The evil effects of starch in early life are due to (a) excess; (b) its administration in the form of a more or less insoluble emulsion instead of as soluble starch; and (c) the substitution of starch for the necessary protein, fat, and salts. In other words, the mischief results from deficiency of necessary proximate principles of diet rather than from the presence of starch.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 701; from Lancet, Nov. 6, 1909, 1343.

Starch-Syrup—Detection in Honey and Fruit Juices.—Having observed that "honey-dextrin," from Coniferæ honey, is not precipitated by alcohol in the presence of hydrochloric acid, J. Fiehe applies this observation to a method for determining the adulteration of honey and fruit juices with starch-syrup, since "starch dextrin" is precipitated by alcohol under the conditions of the test. This is carried out as follows: Ten Gm. of the honey is heated with twice its weight of water on the water-bath.

One Cc. of a 5 per cent. solution of tannin is then added to precipitate albuminous matter. After standing for several hours the liquid is filtered. To 2 Cc. of the clear filtrate 2 drops of hydrochloric acid, sp. gr. 1.19, are added, and then 20 Cc. of alcohol, 94 per cent. If pure, the mixture will remain clear, but if starch glucose be present more or less turbidity will be apparent. In the case of fruit juices, 10 Gm. is treated with an equal weight of water and 8 drops of ammonium oxalate solution, and boiled. The turbid liquid is then treated with a little animal charcoal and filtered. The above test is then applied to 2 Cc. of the filtrate.—Pharm. Zentralh., 50 (1909), No. 43, 900; from Arb. a. d. Kais. Gesundh. Amt., 1909, 218.

Inulin—Quantities contained in Various Drugs.—Laine Rundqvist has determined the percentage of inulin contained in a number of roots and rhizomes, and reports the following results: Radix Artemisiae, 9.66 per cent.; R. Bardanæ, 46.25 per cent.; R. Carlinæ, 17.87 per cent.; R. Cichorii, 18.50 per cent.; R. Farfaræ, 17.40 per cent.; R. Helenii, 35.10 per cent.; R. Pyrethri German., 26.19 per cent.; R. Pyrethri Roman., 35.66 per cent.; Rhizoma Arnicæ, 5.55 per cent.—Pharm. Ztg., lv (1910), No. 4, 37; from Svensk Farm. Tidskr., 1909.

Sugars—Question of "Caramelization" by Rivas' Test.—David Wilbur Horn contributes a paper in which he demonstrates experimentally that several phenomena accounted for by an *assumption* of caramelization may be accounted for by facts known to many chemists. Thus, the brown color of old syrup of ferrous iodide has been assumed to be due to caramelization, and several authors have more recently accounted for the yellow to brown colors produced on heating glucose with sodium hydroxide as, for example, in Rivas' Test for *B. Coli*, to the same action. Conceding that by his experiments and illumination of the question, the last word has probably not been said, the author believes there is ample evidence that the assumption of "caramelization" in the case mentioned has no adequate experimental basis, and, not even probability, while the alcoholic and aldehydic characters of glucose may well account for the phenomena attributed to caramelization.—Amer. Journ. Pharm., April, 1900, 151-161.

Caramel—Saccharane a Definite Coloring Constituent.—F. Ehrlich finds that by heating, sugar, *in vacuo*, in an oil bath to 200° C., extracting the residue with boiling methylic alcohol until no more coloring matter is extracted, then redissolving the insoluble residue in water, filtering and evaporating to dryness *in vacuo*, an amorphous tasteless product is obtained, soluble in water, not precipitated by lead acetate, which is stated to have the definite chemical formula, $C_{12}H_{22}O_{11} \cdot 2H_2O$, and to possess an intense and constant tinctorial power. This has been named saccharane. It is proposed to employ saccharane as the standard for determining the color value of commercial caramels, expressing the degree of coloring power in terms of saccharane. Maltose, when similarly treated, gives a

product of less tinctorial power. Dextrose, fructose, and starch produce no saccharane. The yield from sugar is about 20 per cent. Pharm. Journ. and Pharmacist, March 26, 1910, 398; from Bull. Chim. Soc., 1909, 140, through Annales Chim. Analyt., 15 (1910), 27.

New Crystallizable Polysaccharides—Production from Starch.—By the action of *Bacillus macerans* cultures on starch paste at 45° C. in presence of nutrient salts, F. Schardinger has obtained two crystallizable polysaccharides, acetone being formed at the same time. Neither of these polysaccharides reduce Fehling's solution, nor are they decomposed by yeast. The first of these, obtained from the aqueous product of reaction in the form of stout prismatic crystals, is designated by the author as

Crystallized Amylodextrin. This contains about 14.5 per cent. of water and, according to the variety of starch, shows an optical rotation of + 136° to + 138° (anhydrous = + 158°). The mother liquors yield the second polysaccharide.

Crystallized Amylose, which crystallizes from alcohol in lancet-shaped needles, showing an optical rotation of + 127.4°. The aqueous solution becomes yellow-brown with iodine, while that of amylodextrin becomes yellow, and on standing both deposit gray to green or blue crystalline needles.—Pharm. Centralh., 51 (1910), No. 3, 50; from Chem, Ztg., 1909, Rep. 50.

Galactose—Estimation.—The following method for estimating galactose is proposed by A. Fernace: 5 Gm. of galactose is placed in a tared beaker of 150 Cc. capacity, with 60 Cc. of nitric acid of specific gravity 1.150; the mixture is evaporated on a water-bath until the residue weighs 15 to 16 Gm. After cooling, 40 Cc. of water is added and the mixture set aside for twelve hours. The mucic acid which is precipitated is collected in a Gooch crucible, washed with 50 Cc. of water, and finally dried at about 100° C. until the weight is constant. Under these conditions, 100 parts of galactose equal 70 of mucic acid; a sample of galactose giving 70 per cent. of its weight of mucic acid is considered as sufficiently pure.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 701; from Ztschr. Physiol. Chem., 61 (1909), 284.

Dulcitol—A Sugary Secretion from the "Ghost Bug."—D. Hooper states that *Phromnia marginella*, Olivier, the ghost bug, yields a white sugary secretion. The insect is found generally in northeast India. It affects various trees, such as *Elæodendron glaucum*, Pers., *Grevillea robusta*, etc. In Garhwal, the insects are called Dhaberi (sheep) on account of their habit of clustering together and jumping away when disturbed. They feed by sucking up the juices of the leaves, and the sugary matter is said to be excreted in a liquid state by the larvæ, and dropped onto the leaves, where it hardens and gives the bushes the appearance of having been frosted or whitewashed. This deposit is a manna-like sub-

stance of a pure white color. It occurs in grains of various sizes, or forms incrustations on and around the organs of the plant. It is sweet to the taste, and may be moulded like wax into balls. The solidified secretion is readily soluble in boiling water, from which it deposits, on cooling, hard, white, transparent crystals, which are neutral in reaction, inodorous, and slightly sweet, with melting-point 186°C . When burned they give off an odor of caramel, and leave no ash. They are soluble in about 12 parts of water at 28°C ., and in $2\frac{1}{2}$ parts of boiling water; scarcely soluble in alcohol, even on boiling. The solution does not reduce "Fehling" even after prolonged boiling with dilute acid. A combustion of the sugar afforded 39.3 per cent. of carbon, 7.7 per cent. of hydrogen, and 53 per cent. of oxygen, so that the body is dulcitol (dulcite), an isomeride of mannitol (mannite), $\text{C}_6\text{H}_{14}\text{O}_6$. The occurrence of dulcitol in the secretion of *Phromnia marginella* affords evidence as to the origin of certain manna-like incrustations on plants. The dulcitol in this case is deposited by the insect in an almost pure condition.—Pharm. Journ. and Pharmacist, June 25, 1910, 788; from Journ. and Proceed. Asiatic Soc. of Bengal, v (1909), No. 9, 363.

Fucose—Properties.—B. Tollens and F. Ruvier have determined that fucose, $\text{C}_6\text{H}_{12}\text{O}_6$, exists to the extent of about 0.8 per cent. in dried seaweed. It does not undergo hydrolysis; it shows bi-rotation, and when oxidized by nitric acid gives dextrorotatory trioxylglutaric acid; the similar glutaric acid formed by rhamnose is levorotatory.—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 81; from Berichte, 42 (1909) 2009.

Stachyose—Occurrence in the Roots of Labiate Plants.—L. Pianet has determined the presence of stachyose by the aid of invertin in the subterranean parts of a number of labiate plants. The sugar was obtained in crystals and identified as stachyose by its optical properties before and after the action of invertin, by the melting point, and by the formation of mucic acid on oxidation with nitric acid. The following plants yielded this sugar: *Lamium album*, L., *Stachys lanata*, L., *Stachys sylvatica*, L., *Stachys recta*, L., *Origanum vulgare*, L., *Mentha sylvestris*, L., *Bullota foetida*, L., *Clinopodium vulgare*, L., *Salvia splendens*, L., and *Salvia pratense*, L.—Pharm. Ztg., LV (1910), No. 48, 491; from Journ. de Pharm. et Chim., 1910, No. 5.

Perseulose—A New Reducing Sugar.—Gabriel Bertrand finds that oxidation of perseite by the bacteria of sorbose gives a new reducing sugar, perseulose, the formula of which is $\text{C}_7\text{H}_{14}\text{O}_7$. This sugar is a ketonic sugar, for it is not oxidized by bromine in aqueous solution, and, moreover, when hydrogenated by means of sodium amalgam and water it gives a mixture of two stereoisomeric alcohols, one of which is perseite, while the other, which has not been prepared previously, may be called perseulite. This result can only be explained on the assumption that perseulose contains

the CO group in its molecule. Its relation to perseite is exactly the same as that of sorbose to sorbite, and it is thus the first representative of ketonic sugars with 7 atoms of carbon.—Chem. News, Oct. 8, 1909, 184; from Compt. rend., 149 (1909), No. 3.

Vicianose.—*A Reducing Sugar from Vicia Angustifolia*.—Gabriel Bertrand and G. Weissweiler, by the diastasic hydrolysis of the glucoside vicianin, obtained from the seeds of *Vicia angustifolia*, have isolated a new reducing biose to which they have given the name *vicianose*. It is very soluble in water, and only very slightly soluble in strong alcohol. Its rotatory power is given by $[\alpha]_D = +36^\circ 72'$. It fuses at 210°C . and elementary analysis shows that its formula is $\text{C}_{11}\text{H}_{20}\text{O}_{10}$. Chem. News, March 4, 1910, 107; from Compt. rend., 150 (1910), No. 2.

ORGANIC ACIDS.

Glacial Acetic Acid—Commercial Quality.—Results of experiments recorded by Hermann C. T. Gardner indicate that glacial acetic acids of commerce can not conform to the B. P. standards of melting point nor absolute acid percentage (99 per cent.), and the author concludes that these discrepancies are doubtless attributable to the confusion caused by the anomalous statements of the official monograph, which should be corrected in the next edition of the B. P.—Pharm. Journ. and Pharmacist, July 17, 1909, 69.

Glacial Acetic Acid—Precaution in Determining the Strength by Titration.—P. A. W. Self recommends the following simple precaution to prevent loss of acetic acid during weighing and titration of glacial acetic acid. Into a tared bulb of thin glass furnished with a capillary opening (conveniently made by drawing out a narrow test-tube at an inch or so from its closed end) introduce a convenient quantity of the acid by the well-known expedient of warming the bulb and allowing to cool with the end of the capillary dipping below the surface of the acid. Then seal the capillary and weigh. Next place the bulb in a strong stoppered bottle containing an amount of standard alkali in excess of that required by the acid, stopper the bottle, break the bulb by vigorous shaking, and finally titrate the excess of alkali in the usual way. Obviously no danger whatever of loss by volatilization is possible, and the additional trouble is almost inappreciable.—Pharm. Journ. and Pharmacist, Dec. 11, 1909, 729.

Acetone—Iodometric Determination.—Ludwig Krauss has subjected the iodometric method of Messinger-Huppert which is usually employed for the determination of acetone in urine to critical experimentation, and following the directions of E. Späth ("Die chemische und mikroskopische Untersuchung des Harns," 3d Ed., 1908) in conducting the details, obtained results which proved to be absolutely unreliable. The method is carried out as follows: 50 Cc. of the aqueous acetone solution (or distillate

from the urine) are mixed with 30 Cc. $\frac{N}{T}$ alkali and 25 Cc. $\frac{N}{T}$ iodine solution, shaken *one-half minute*, then acidulated with 30 Cc. of 5 per-cent. HCl, and titrated with $\frac{N}{T}$ thiosulphate. In this way the results are invariably too low. But if the mixture of acetone, alkali and iodine solution is frequently *shaken during 15 minutes*, before acidulation with HCl, the results are absolutely constant and uniformly reliable, not only for solutions of pure acetone, but also for the distillate from urine containing acetone.—Apoth. Ztg., xxiv (1910), No. 3, 22.

Acetone—Identification by Conversion into Acetylcarbinol.—C. Denigès observes that the reactions in general use for the identification of acetone are for the most part uncertain, and therefore proposes the following: He first treats the acetone with bromine water, and then converts the bromacetone thus obtained into acetylcarbinol by means of sodium carbonate. The method he adopts is to heat, for twenty minutes on a boiling water-bath, a mixture of 0.1 to 0.2 Cc. of acetone and 10 Cc. of 6 per cent. bromine water. The contents of the tube containing the mixture are then boiled until bromine vapors have completely disappeared and the liquid is colorless. The liquid (A) contains for the most part bromoacetone and at the same time a little acetylcarbinol. Five Cc. of the liquid, which gives off a very irritating odor, are treated with 0.5 Cc. of a ten per cent. sodium carbonate solution (and then gently boiled for a few moments to convert the bromacetone into acetylcarbinol. This liquid B is allowed to cool, and 0.4 Cc. of it is treated with 0.1 Cc. of a four per cent. solution of potassium bromide and 2 Cc. of pure sulphuric acid (specific gravity, 1.84), in a test-tube. After shaking, 0.1 Cc. of a five per cent. alcoholic solution of salicylic acid is added, and the mixture again shaken. There is developed quickly, in the cold, an extremely intense violet or violet-red coloration. If a similar solution of guaiacol instead of salicylic acid be used under the same conditions an equally intense blue coloration is obtained, and that more quickly than the preceding. Under like conditions the liquid A gives similar tints, but much less intense than those of liquid B. The test may be applied to dilute solutions of acetone, and the reactions are regarded as specific for that body.—Pharm. Journ. and Pharmacist, Jan. 22, 1910; from Bull. Soc. de Pharm. de Bordeaux, Nov., 1909, 465.

Benzoic Acid—Preparation from Toluol with Nitric Acid.—Dr. Hans Sacchse has patented a new and economical process for the preparation of benzoic acid from toluol by the action of nitric acid. One part of toluol and 5 parts of nitric acid of 17° C. are introduced into a stoneware jar and heated in an autoclave, lined on the inside with aluminum, or constructed of enamelled iron, at a temperature of 130° – 150° C., until the pressure is no longer increased. After cooling, the nitric oxide produced is allowed to escape (or collected for other technical use), and the residual

crystalline benzoic acid, which is contaminated with only small quantities of nitro compounds, is purified by the aid of reducing agents, washing, drying, and sublimation or distillation. An abundant yield of chemically pure benzoic acid, m. p. 121.5° C., is thus obtained.—Pharm. Ztg., lv (1910), No. 5, 47.

Ammonium Benzoate—The Pharmacopœial Tests.—From a comprehensive study and experimentation on the pharmacopœial tests for ammonium benzoate, Drs. Atherton Seidell and George A. Menge conclude that a simplified method of distillation based on that at present directed in the Pharmacopœia is sufficiently accurate for the quantitative analysis of ammonium benzoate samples. The litmus paper test is, however, inadequate for the determination of free benzoic acid present in amounts as great as approximately 10 per cent., and therefore misleading; while the melting-point, or rather decomposition point determination of ammonium benzoate is shown to be valueless as a test for the purity of this compound. The quantitative determination of ammonia by distillation is briefly described by the authors, in the present style of the Pharmacopœia, as follows:

“The ammonia from a weighed portion of about 0.5 Gm. of the sample, dissolved in H_2O , made alkaline with 50 Cc. of $\frac{N}{10}$ NaOH, is distilled into 50 Cc. of $\frac{N}{10}$ H_2SO_4 , and the excess of the latter remaining after the distillation should require not more than 14.1 Cc. of $\frac{N}{10}$ NH_4OH , using cochineal as indicator.”—Amer. Journ. Pharm., Jan., 1910, 12–20.

Saccharin—Confirmation of its Presence in Foods and Beverages.—F. A. Genth, Jr., recommends the following method for the detection and confirmation of saccharin in 50 Cc. of a solution containing four milligrams of that substance in a liter: The absence of salicylic acid having been proven in a part of the residue from an ethereal extract, the remainder is dissolved in 1 Cc. of water made slightly alkaline with ammonia, transferred to a small crucible and evaporated to incipient dryness. A drop or two of water and a very small piece of NaOH are then added, and the whole quickly heated to dryness; when dry, the mass is further heated to fusion; after cooling, 1 Cc. of water is added, and the larger portion of alkali neutralized by HCl or H_2SO_4 . After adding one or two drops of a 1 per cent. ferric alum solution, the neutralization is continued by dropping the acid from a fine pipette and stirring the solution. Operating in this way, where large amounts of saccharin were present, the violet color could be seen at the point of neutrality; in small quantities this point is frequently missed, but a careful back titration with a very dilute alkaline solution (very dilute ammonia, 1–20) generally indicated its presence.—Proc. Penna. Pharm. Assoc., 1909, 334–335.

Sodium Cacodylate—Variable Hydration.—P. Lemaire observes that the new French Pharmacopœia prescribes the anhydrous form of sodium

cacodylate, containing 46.87 per cent. of arsenium. Lately the commercial form of the salt has generally contained two molecules of water, or 38 per cent. of arsenium; but other specimens have been met with on the market containing from two to five molecules of water.—Pharm. Journ. and Pharmacist, Jan. 29, 1910, 109; from Répert. de Pharm., 21 (1909), 250.

Cinnamic Acid—Preparation and Properties.—G. Mossler says that cinnamic acid, $C_6H_5CH : CHCOOH$, may be obtained from storax by distilling it with excess of alkali, when styrol and cinnamyl alcohol pass over; the sodium cinnamate is extracted from the non-volatile residue by hot water, and cinnamic acid precipitated from this by hydrochloric acid; it is purified by repeated solution in ammonium carbonate, reprecipitating by hydrochloric acid. It can be made synthetically from benzaldehyde, sodium acetate, and acetic anhydride by Perkin's reaction, or from benzal chloride and sodium acetate. Cinnamic acid is a colorless, tasteless, crystalline substance with a slight cinnamon-like odor, very little soluble in cold water, easily in hot water, alcohol, chloroform, ether, and fatty oils; melting-point, 133° – 135° C.; boiling-point, 300° C., with slight decomposition. An alcoholic solution of the acid or an aqueous solution of the salt gives a yellow precipitate with ferric chloride, and a white precipitate with calcium chloride; a hot solution, to which a little potassium permanganate is added, gives an odor of benzaldehyde. The acid should show not more than the faintest trace of chlorine if 0.5 Gm. is mixed with 2 or 3 Gms. of quicklime and ignited, the residue dissolved in dilute nitric acid, and tested with silver nitrate.

Sodium Cinnamate, identical with "Hetol," is obtained by neutralizing the hot aqueous solution of the acid with sodium carbonate. The ash of sodium cinnamate should not show more than faint traces of sulphate or chloride. Solutions of this salt should be sterilized within at most two or three hours of being prepared, or they will not keep; lime compounds should be entirely absent, and the heating should not be continued for more than ten minutes.—Pharm. Journ. and Pharmacist, June 11, 1910, 727; from Ztschr. Allgem. Oesterr. Apoth.-Ver., March 12, 1910, 79.

Citric and Tartaric Acids.—Examination for Impurities.—W. B. Cowie examined several samples of citric acid for impurities in accordance with the suggestions in the report of the Committee of Reference to the Pharmacopœia Committee, and appends the results as follows:

Standards—Lead, 5 parts per million; sulphates, not more than would be produced by 5 Cc. $BaCl_2$ solution added to 1 Cc. $\frac{N}{1000} H_2SO_4$ in 50 Cc. H_2O .

	Lead	Sulphates	Calcium	Arsenic	Other Metals
Sample 1 . . . 6, million	Trace	Trace	Free	Free	
" 2 . . . 5, "	Free	Free	Free	Free	
" 3 . . . 5, "	Free	Trace	Free	Free	

With the exception of the first, and even it is on the border-line all are within the standard with every impurity except the lead.

Several samples of tartaric acid were similarly examined, the Committee of Reference standards being :

Lead, 10 parts per million; sulphates, as in citric acid. The results are :

	Lead parts per Mill.	Sulphates	Calcium	Arsenic	Other Metals
Sample 1	16	Trace	Trace	Free	Free
" 2	8	Free	Free	Free	Free
" 3	22	Heavy	Heavy	Free	Free

It will be seen that No. 2 is the only one of the three which is within the standard, No. 1 having a large proportion of lead but otherwise good, No. 3 having an excessive proportion of lead and sulphate and calcium equal to the maximum allowed.—Chem. & Drugg., Dec. 25, 1909, 968.

Magnesium Phospho-Tartrate.—*Preparation and Properties.*—According to K. Sorger, magnesium phospho-tartrate may be prepared by three methods, (1) by treating magnesium phosphate with tartaric acid or magnesium acid tartrate; (2) by the action of phosphoric acid or magnesium acid phosphate on neutral magnesium tartrate; (3) by treatment of acid sodium phospho-tartrate with magnesium oxide. The salt is a tasteless, white powder, difficulty soluble in water and diluted acids, easily soluble in ammonia and diluted alkalis. It is not decomposed in the gastric juice, but becomes active in the intestines; it has no injurious effects and may be taken for prolonged periods. Pharm. Journ. and Pharmacist, August 14, 1909, 240; from Chem. Ztg. Rep., July 25, 1909, 382.

Antimony and Potassium Tartrate.—*U. S. P. Assay Method.*—Virgil Coblentz and Otto B. May have made comparative experiments in order to determine the validity of recent criticisms on the part of manufacturers, to the effect that the U. S. P. iodometric assay of tartar emetic gives results that are uniformly too low. Using material of the highest purity, consisting of small white, partly effloresced crystals, which to secure uniformity were reduced to a fine powder, the antimony was determined both gravimetrically and electrolytically, and the results compared with that obtained iodometrically. These showed that each method yielded concordant results in three separate determinations by each, but that they do not agree among one another. Nevertheless, the difference is comparatively insignificant, the gravimetric estimations averaging 37.19 per cent. Sb = 103.18 per cent. pure salt., whilst the volumetric estimation averaged 36.94 per cent. Sb = 101.92 per cent. pure tartar emetic. These differences may be accounted for by the presence of small quantities of antimonious salt, and this might be taken into account either by lowering the purity rubric or the number of Cc. of iodine V. S. required in the present method of assay.—Merck's Rep., Aug., 1909, 195.

Elaeric Acid—Production from Elaterin by Caustic Alkali.—A. Berg finds that *elaeric acid* ($C_{28}H_{38}O_7$), isomeric with elateridin, results from the action of caustic alkali on elaterin. At first elateridin and acetic acid are formed, but on boiling for half an hour with dilute alcoholic alkali the former is transformed into the acid. The process does not appear to be one of oxidation, since it occurs when oxygen is excluded. The conversion of the lactone into an acid is probably due to the transposition of a molecule of water. Elaeric acid and its salts are amorphous; the alkali salts are very soluble in water and in alcohol. The silver salt is precipitated in a colloid mass, resembling silica in appearance. It is soluble, when pure, in water, but is reprecipitated from solution on adding a little silver nitrate. The copper salt is insoluble in water, but very soluble in alcohol and in acetic ether, from which it is deposited on evaporation as a dark-green varnish.—Pharm. Journ. and Pharmacist, July 17, 1909, 73; from Compt. rend., 148 (1909), 1679.

Formic Acid—Quantitative Determination.—H. Franzen and G. Greve find that formic acid is best determined as follows: From 0.2 to 1.0 Gm. of the acid, in the form of a soluble formate, is dissolved in about a liter of water; fifteen times as much mercuric chloride, dissolved in 100 to 200 Cc. of hot water, is then added, with stirring. The vessel is kept in a water-bath at 95° to 100° C. until the precipitated calomel has settled; caustic soda is then added, with stirring, until the brownish-yellow precipitate (HgO) at first formed no longer redissolves, and heating in the water-bath is continued until the precipitate has settled. The addition of soda and the heating are then repeated, and after the second precipitate of mercuric oxide has settled, 20 Cc. of strong hydrochloric acid are added and the whole well stirred and again heated in the water-bath for an hour. The precipitated calomel is then collected in a Gooch crucible, well washed with hot water, dried for six hours at 95° to 100° C., and weighed; its weight multiplied by 0.097726 gives the weight of formic acid.—Apoth. Zeit., xxiv (1909), No. 91, 858.

Formic Acid and Formates—Volumetric Method of Estimation.—F. Auerbach and W. Pluddemann recommend a method for the volumetric estimation of formic acid, based on the reduction of mercuric chloride by formic acid, or formates, according to the equation $2HgCl_2 + HCOOH = Hg_2Cl_2 + CO_2 + 2HCl$. This reaction proceeds to completion if the concentration of hydrogen ions is not too great, and this is prevented by carrying out the reaction in presence of a sufficient quantity of sodium acetate. Mercuric chloride solution of known concentration is used, and the amount of formic acid present can be determined by estimating the quantity of mercuric salt still present after filtration from the precipitated mercurous salt. This can be effected by titration with potassium iodide, $HgCl_2 + 4KI = HgI_2 + 2KI + 2KCl$. The double iodide remains in solu-

tion until mercuric chloride is in excess, when the red mercuric salt begins to separate. This happens, however, before the quantity of mercuric salt corresponding with the above equation has been added, owing to the secondary reaction $\text{HgI}_2 + 2\text{KI} + \text{HgCl}_2 \rightarrow 2\text{HgI}_2 + 2\text{KCl}$, which depends upon the relative concentrations of the salts in solution. The error due to this factor can be eliminated by titrating the mercuric salt into a definite quantity of potassium iodide solution of a certain standard strength. The deviations from the true stoichiometric relations having been experimentally determined for this particular quantity of solution of given strength and tabulated, it is easy to estimate the amount of mercuric chloride in any solution.—Pharm. Journ. and Pharmacist, Aug. 14, 1909; 240; from Arb. Kais. Gesundh. Amt., 1909, 30; through Journ. Reg. Inst.

Juniperic and Sabinic Acids—Constitution.—M. J. Bougault has determined in the course of further studies on the constituents of conifera wax that *sabinic acid* is to be regarded as being an oxyaurinic acid of the formula $\text{CH}_2\text{OH}(\text{CH}_2)_{10}\text{COOH}$, and that *juniperic acid* is an oxypalmitic acid, $\text{CH}_2\text{OH}(\text{CH}_2)_{14}\text{COOH}$. Furthermore, the author has shown that *thapsic acid* is identical with tetradecamethylen-dicarboxylic acid, $\text{COOH}(\text{CH}_2)_{14}\text{COOH}$. These results establish in the three naturally occurring acids: palmitic, juniperic and thapsic, a very simple constitutional relationship, as is shown in the following:

Palmitic acid = $\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$.

Juniperic acid = $\text{CH}_2\text{OH}(\text{CH}_2)_{14}\text{COOH}$.

Thapsic acid = $\text{COOH}(\text{CH}_2)_{14}\text{COOH}$.

—Pharm. Ztg., lv (1910), No. 47, 480; from Journ. de Pharm. et Chim., 1910, No. 9.

Lactic Acid—Modification of Uffelmann's Test.—This test depends upon the observation that when a few drops of ferric chloride solution are added to 10 Cc. of a 2 per cent. phenol solution, the amethyst blue color produced under ordinary conditions is replaced by a lemon-yellow color if lactic acid is present even in small quantities. This reaction is also produced by citric and tartaric acid, but not by inorganic acid. It becomes far more delicate, however, according to Dr. Hugo Kühn, if the phenol solution is replaced by a cold saturated solution of salicylic acid, the test being made as follows: To 5 Cc. of a cold saturated solution of salicylic acid (1:100), 1 drop of ferric chloride solution (G. P.) is added. The handsome amethyst-blue color produced, immediately changes to an intense yellow color on the addition of strongly diluted solutions of lactic acid—the sensitiveness of the reaction increasing with the degree of dilution. Unfortunately the test cannot be regarded as characteristic for lactic acid, since, as experimentally determined by the author, the addition of citric, tartaric or oxalic acid produces the same reaction.—Pharm. Ztg., lv (1910), No. 12, 120.

Lactic and Glycollic Acids—Very Delicate Reactions.—G. Denigés finds that lactic acid, in presence of concentrated sulphuric acid, decomposes very easily and almost quantitatively, at the temperature of boiling water, with formation of aldehyde, which, when condensed with phenols and alkaloids of the morphine group, yields colored products, which afford a means of detecting lactic acid even in traces. In a test-tube 0.2 Cc. of a lactic acid solution (containing not more than 2 per cent. of the acid) is mixed with 2 Cc. of sulphuric acid of specific gravity 1.840. The mixture is heated on a boiling-water bath for two minutes, cooled, and then treated with one or two drops of five per cent. alcoholic solution of guaiacol or codeine, and then shaken. In the case of guaiacol a red-fuchsine tint is developed, still discernible as a rose coloration with 0.01 Mgm. of lactic acid in the same quantity of liquid; with codeine a red-yellow with concentrated solutions, and yellow with dilutions, is obtained. Treated under the same conditions, but at a higher temperature than that of boiling water, glycollic acid yields formaldehyde, for the detection of which codeine, guaiacol, or *p*-cresol may be used, in 5 per cent. alcoholic solution. Two to 10 Mgms. of the acid, 2 Cc. of water and 2 Cc. of sulphuric acid (specific gravity 1.840), are heated in a test-tube over a naked flame until there is a somewhat rapid disengagement of gas bubbles; on cooling a single drop of the codeine solution is added, and the mixture shaken, when there is developed a yellow coloration which quickly becomes deep violet. In the case of the other two reagents one or two drops of the alcoholic solution, and 1 Cc. of glacial acetic acid, are added to the mixture of glycollic acid and sulphuric acid before heating; on heating and shaking the mixture there is quickly produced, with the paracresol, a green or green-brown color, while with guaiacol the color is violet.—Pharm. Journ. and Pharmacist, July 24, 1909, 105, from Bull. Soc. Chim. 1909, 647.

Bismuth Salicylate—Quantitative Determination of Free Salicylic Acid.—In continuation of his experiments on the estimation of free salicylic acid in bismuth salicylate (see "Proceedings," 1909, 367), J. Bristowe P. Harrison has experimented with various solvents and finds æther purificants, sp. gr. 0.720 (from methylated spirit), and chloroform to be the best solvents for the purpose of extracting the free acid with a minimum of decomposition of the salt. The ether is preferred owing to greater rapidity of work, but chloroform has the advantage that it dissociates the salt to a smaller degree. However, inasmuch as the amount of decomposition (practically 0.03 per cent.) by ether is constant, this can be corrected. Further experiments have led the author to the conclusion that there are at least two distinct bismuth salicylates on the market, one approximating to a true salt of salicylic acid, the other a more or less loose combination of the acid and base, so that the *exact* determination of free acid is, to say the least, a matter of extreme difficulty.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 303-311.

Sodium—Mercuriamido-oxyisobutyrosalicylate is a new mercury compound which is recommended for the subcutaneous administration of mercurials on account of its ready solubility and freedom from irritant or painful effects. It is an amorphous, faint yellowish, hygroscopic powder, containing about 40 per cent. of Hg, insoluble in alcohol and ether, but extremely soluble in water, forming solutions which are alkaline to litmus, but only redden phenolphthalein slightly. The compound possesses great stability, its aqueous solution keeping well when exposed to the air, while alkalis do not produce a precipitate even on heating. Ammonium sulphide also does not affect the solution at the ordinary temperature, until heated, or after prolonged standing. Acids, however, occasion an immediate precipitate. It may be administered as an antiluetic in doses of 0.1 to 0.15 Gm.—Apoth. Ztg., XXIV (1909), No. 97, 911.

Tribrompyrocatechin—Preparation.—Tribrompyrocatechin is obtained under a German patent by the following simple process: 3.3 kgm. of pyrocatechin are suspended in 45 liters of chloroform and 14.4 kgm. of bromine, dissolved in 15 liters of chloroform, are gradually added with constant stirring, and refrigeration to a temperature of about 15°C. the reaction being completed when the bromine has completely disappeared. The product of the reaction is then separated by filtration, washed with water, dissolved in alcohol, and precipitated from its alcoholic solution by fractionation with water. Tribrompyrocatechin is so obtained in colorless, odorless crystals, containing 1 mol. of water of crystallization, and melting at 138° to 139° C.—Pharm. Ztg., LV (1909), No. 5, 47.

ORGANIC BASES.

Alkaloidal Salts—Solubilities.—George L. Schaefer has determined the solubilities of a number of alkaloidal salts in different solvents at different temperatures with results at variance with the figures given in the U. S. P.

Quinine Hydrobromide is not soluble in the proportion 1:16 in ether, but is very difficultly soluble requiring about 700 parts of solvent for solution.

Quinine Hydrochloride is not soluble in ether in the proportion of 1:240, but requires about 1000 parts of the solvent.

Quinine Salicylate is soluble in water at 25° C. in the proportion of 1:2100 and at 80° C., 1:280; in alcohol at 25° C., 1:23, and at 60° C. 1:5, in ether, 1:780; in chloroform 1:10.

Codeine Alkaloid is soluble in 25 parts of ether, not 12.3 parts.

Strychnine Alkaloid, at 25° C., is soluble in 150 parts of alcohol, or 7 parts of chloroform.

Strychnine Nitrate, at 25° C., requires 55 parts of water, or 220 parts of alcohol for solution.

Strychnine Sulphate is soluble in 45 parts of water at 25° C., but re-

quires only 9 parts at 80° C. It is soluble in 105 parts of alcohol at 25° C.—*Amer. Journ. Pharm.* May, 1910, 218-221.

The Assay Methods of the U. S. P., as applied to the more important alkaloidal drugs, are critically discussed by A. R. L. Dohme and H. Engelhardt, with particular endeavor to replace some of the more tedious ones by more expeditious and equally accurate methods. The paper appears in the "Proceedings," 1909, 879-886.

Alkaloids—Modification of Volhard's Method of Titration.—Referring to Volhard's method, Elias Elvove observes that the alkalimetric method of determining alkaloids is impeded by the fact that each indicator can be used only for one or a few alkaloids, but that by the use of alkaloidal hydrochlorides, the alkaloids may be indirectly determined by Volhard's method based on the titration of the hydrochloric acid. In continuation of previous studies, the author has applied the method to the determination of cocaine, morphine, codeine, narcotine, atropine, hydrastine, pilocarpine, and brucine, and obtained in most instances and under varying conditions of concentration closely concordant results. The method, as conducted by the author, is as follows: The alkaloidal solution is treated with hydrochloric acid, evaporated on a water-bath to dryness, and then evaporated twice more after the addition of 5 Cc. of alcohol each time. The residue is now dissolved in water and titrated with $\frac{N}{10}$ potassium hydroxide, using phenolphthalein as indicator. If by this treatment the alkaloid is precipitated, the liquid is filtered, and in the filtrate after acidulation with nitric acid, the hydrochloric acid titrated according to Volhard's method.—*Pharm. Ztg.*, lv (1910), No. 29, 294; from *N. Chem. Zentralbl.*, 1910, No. 9.

Alkaloidal Salts—Indirect Determination by Titration of the Combined Acid.—E. Runne finds it practicable instead of determining the degree of hydration of alkaloidal salts by drying and weighing to make an indirect determination by titration of the combined acid. If a suitable indicator is used the acid may be titrated with $\frac{N}{10}$ alkali, just as if no alkaloid were present. Phenolphthalein is the best of the common indicators for the purpose, but a series of comparisons between phenolphthalein and Poirrier's blue (which is a weaker acid than the former), using alkaloidal salts of a known degree of purity, showed that the latter possesses certain advantages and gives very satisfactory indications. The alkaloid salt is dissolved in alcohol, from 2 to 5 drops of a 1 in 500 solution of Poirrier's blue are added, and $\frac{N}{10}$ alkali run in until the blue color changes to red; the small amount of alkali necessary to change the color of the indicator is ascertained by a blank titration and deducted. Morphine salts cannot be titrated in this way, either with this indicator or phenolphthalein, on account of the phenolic nature of the base.—*Pharm. Journ. and Pharmacist*, Oct. 23, 1909, 507; from *Apoth. Ztg.*, xxvi (1909), No. 72, 662.

Alkaloids and Salts—Sulphuric Acid Test.—George L. Schaefer considers it important that the sulphuric acid test prescribed in the U. S. P. for a number of chemicals (chiefly alkaloids or their salts), should be carried out in distinct proportions of the substance and concentrated sulphuric acid to get uniform results in the hands of different experimenters. In his experience he has found the following proportions satisfactory :

0.01 Gm. of the Substance to 5 Cc. of Concentrated H_2SO_4 .—Hyoscyne hydrobromide ; hyoscyamine sulphate ; hyoscyamine ; physostigmine sulphate ; physostigmine salicylate ; pilocarpine hydrochloride ; pilocarpine nitrate ; sparteine sulphate.

0.1 Gm. of the Substance to 10 Cc. of Concentrated H_2SO_4 . : Caffeine ; cinchonidine sulphate ; cinchonine sulphate ; cocaine hydrochloride ; codeine ; codeine phosphate ; codeine sulphate ; morphine ; piperine ; quinine ; quinine bisulphate ; quinine hydrobromide ; quinine hydrochloride ; quinine sulphate ; strychnine ; strychnine sulphate.

In the case of atropine 0.02 Gm. ; 5 Cc. should be used ; in that of benzoic acid, 1 Gm. ; 10 Cc. of H_2SO_4 .—Amer. Journ. Pharm., May, 1910, 222.

Alkaloids—New Reaction with Hydrogen Dioxide.—Ed. Schär at a session of the Swiss Chemical Society on September 7, 1909, described several new reactions obtained with perhydrol (Merck's hydrogen dioxide) and solutions of certain alkaloids in concentrated sulphuric acid. Quinine gives an intense yellow color, which may reciprocally serve as a sensitive reaction for hydrogen dioxide. The reactions with perhydrol may be supplemented with Bredig's platinum solution, yielding with strychnine for example a permanent purple-red coloration. The entire series of opium alkaloids affords handsome color reactions. The new reagent also affords a convenient medium for the production of the murexid and other color reactions.—Schweiz. Wschr. f. Chem. u. Pharm., xlvii (1909), No. 40, 623.

Alkaloids—Nitro-Derivatives as Precipitants.—L. Rosenthaler and P. Görner state that, with the exception of o-nitrophenol and o-nitrocresol, the different nitro compounds investigated by them give characteristic precipitates with a large number of organic bases, although these reactions are not sensitive enough to make them available for alkaloidal determinations. The color of these precipitates, dependent on that of the reagents, exhibits all shades, from yellowish-white to deep orange-yellow and blood-red. The precipitates of mono-di- and triphenol are yellowish-white to lemon-yellow ; dinitrocresol in general brownish-yellow, but with strychnine red ; tetranitrophenolphthalein yields an orange-yellow, hexanitrodiphenylamine orange-red to brick-red precipitates. The precipitates produced by dinitro-*a*-naphtholsulphonic acid are lemon- to orange-yellow, those of dinitroanthrachrysonsulphonic acid red-yellow to blood-red.

Nevertheless, many of these precipitates are sufficiently characteristic to be available for the determination of the alkaloids producing them. Such are arecoline, cinchonine, hordenine, hydrastinine, cocaine, coniine and strychnine, while for berberine it is characteristic that its solutions gelatinize on addition of dinitro-*a*-naphtholsulphonic acid.—Pharm. Ztg., lv (1910), No. 47, 480; from Ztschr. f. anal. Chem., 1910, 343-357.

Betaine Hydrochloride—*Synthesis*.—According to G. Mossler, betaine, also known as oxyneurine, lycine, and trimethyl glycocoll, and, in form of hydrochloride, chemically identical with *acidol*, may be prepared synthetically by the action of monochloroacetic acid and trimethylamine. Commercially it is obtained by extracting the betaine from the residues of sugar-refining by means of strong alcohol, adding the calculated quantity of hydrochloric acid, and crystallizing from alcohol. Betaine hydrochloride occurs as colorless, odorless crystals, with strongly acid reaction and taste, easily soluble in water and dilute alcohol, slightly soluble in strong alcohol and insoluble in chloroform or ether. When warmed with alkali, it gives the herring-brine odor of trimethylamine. If exposed to the air for some hours the crystals must not become damp, showing absence of the poisonous neurine, the hydrochloride of which is hygroscopic. The absence of organic impurities may be shown by mixing small quantities with strong sulphuric and nitric acids, when a clear, colorless solution should be obtained in both cases. Ammonia is tested for by adding a few drops of Nessler's solution to a freshly-prepared solution of the salt, when not more than a yellowish tinge should be obtained, and no precipitate.—Pharm. Journ. and Pharmacist, April 16, 1910, 483; from Ztschr. Oesterr. Apoth. Ver., Feb. 5, 1910, 45.

Caffeine—*Phenol Compounds*.—A. J. Utée has prepared a number of compounds of caffeine with phenols, and by the use of equi-molecular quantities of their components obtained well-characterized addition components, particularly with pyrogallol and phloroglucin, from warm, concentrated aqueous solutions.

Caffeine Pyrogallate crystallizes from warm water in needle-shaped crystals, melting at about 70° C. The compound is partly dissociated in aqueous solution, and permits the extraction of caffeine by means of chloroform.

Caffeine Phloroglucinate melts at about 185° C.

The author, furthermore, finds that *theobromine* is easily converted into caffeine by dissolving it in excess of sodium hydroxide solution, shaking the solution with a few drops of dimethyl sulphate and heating it moderately.—Pharm. Ztg., lv (1910), No. 20, 203; from Chem. Weekblad., 1910, pp. 32-34.

Caffeinum Citricum—*Question of Its Chemical Identity*.—The recent supply of alkaloidal caffeine by a German drug firm on an order for "cafein. citric." has elicited an interesting communication by Schmitt, from which it appears that it is a common practice of German wholesale drug

firms to list a "cafein. citric." and a "cafein. citric. ver. Ph. Brit." and to supply the alkaloid "caffeine" unless the order distinctly demands the cafein. citric. verum. of the Ph. Brit. Furthermore, that the practice has been generally accepted by German pharmacists, who unhesitatingly dispense "cafein. purum" when "cafein. citric." is prescribed. This erroneous practice is doubtless due to the assumption, long held, that a true caffeine citrate does not exist; but the author points out that since the existence of the salt as a definite chemical compound has now been demonstrated by E. Schmidt, such substitution is, to say the least, reprehensible, and should be discontinued even if the designation "*verum*" is omitted.—Pharm. Ztg., liv (1909), No. 101, 995.

Referring to the above, "F. S." mentions that the substitution of "cafein. citr." by "cafein. pur." is justified to a certain extent by the official list of synonyms appended to the Ph. Germ. III, in force until 1900, in which, on page 376, line 3 from above, occurs the following definition: "Caffeinum citricum . . . Caffeinum." To avoid errors hereafter, the simplest way would be to admit cafein. citricum to the new (V) edition of the Ph. Germ.—Ibid., liv (1909), No. 103, 1014.

In reference to the preceding subject, Feuerabend calls attention to a possible justification of the substitution, depending on the interpretation of the abbreviation "*Citr.*" Some eighteen years ago he was instructed on this point by his preceptor, who declared that the abbreviated adjective "*citr.*" did not refer to "citricum," but to the lemon-yellow color, "*citrium*," of the caffeine formerly on the market.—Ibid., lv (1910), No. 4, 37.

With the object of cleaning up the controversy engendered by the preceding communications, concerning the existence or non-existence of caffeine citrate, etc., Hermann Schelenz contributes an interesting review covering the history of caffeine from its discovery by Runge in 1819-20. From this, the existence of caffeine citrate as a definite chemical compound must be regarded as indisputable, its formula being $C_8H_{10}NO_3$ — $C_8H_8O_7$, as determined by Gaze in the laboratory of E. Schmidt, in 1903. The Hungarian and British pharmacopœias have since admitted and give formulas for caffeine citrate, whilst the U. S. P. also gives a formula for *caffaina citrata* (citrated caffeine), which designation Schelenz regards as the more appropriate. These preparations are not identical, but possess individual uniformity and are readily prepared by the pharmacist—all of them being based on the older idea of Hager, to effect simple mixtures of caffeine and citric acid in definite proportions.—Ibid., lv (1910), No. 9, 81-87.

Cocaine and its Substitutes.—Differentiation.—C. Saporetti publishes the following table showing the reactions by which cocaine and its substitutes are differentiated, from which the reaction with *calomel* is here omitted, it sufficing to state that *with the exception of Eucaïne-β* all the substances mentioned in the table have a reducing action upon it, as evidenced by the production of a gray color.

Potassium Iodide.	Iodine-Potassium Iodide.	Bromine Water.	Mercuric Chloride.	Sodium Hydroxide.	Potassium Permanganate.
Eucaine- α	White precipitate, insoluble on heating.	Yellow precipitate, soluble on heating.	White precipitate, soluble on heating.	White precipitate, insoluble in excess and on boiling.	Violet precipitate, blackening quickly.
Eucaine- β	Deep red precipitate, soluble on boiling.	Yellow precipitate, slightly soluble on heating, precipitated white on boiling.	.....	White precipitate, insoluble in excess and on boiling.	No precipitate immediately; color persists for a day.
Cocaine	As Eucaine- α	Yellow Precipitate, soluble on heating.	.....	<i>Idem</i>	Violet precipitate; color persists for one hour, then deposits MnO_2 , Violet precipitate, blackening quickly.
Novocaine	As Eucaine- β	<i>Idem</i>	White precipitate, soluble on heating.	<i>Idem</i>	Violet precipitate, blackening almost immediately.
Slovaine	As Eucaine- α + peculiar resinous odor.	<i>Idem</i> .....	.....	White precipitate, insoluble in excess; aromatic odor on boiling.	Precipitate, first maroon, then brown.
Nirvanine	As Eucaine- α	<i>Idem</i>	White precipitate, soluble on heating.	Precipitate, very soluble in excess of the reagent.	.....
Allypine	Yellow-maroon precipitate, insoluble on boiling: orange-red deposit.	<i>Idem</i> , but the liquid becomes red and gives an agreeable fruity odor. Yellow precipitate, soluble on gentle heating.	<i>Idem</i>	White precipitate, insoluble in excess and on boiling.	Bluish-violet precipitate, slowly blackening.

—Pharm. Journ. and Pharmacist, Febr. 26, 1910, 235; from Boll. Chim. Farm., 1909, 479, through Bull. de Pharm., du Sud-Est.

Caffeine Sodium Salicylate—Preparation and Properties.—According to G. Mossler, caffeine sodium salicylate is prepared by dissolving a mixture of equal weights of caffeine and sodium salicylate in water and evaporating to dryness; it forms a white odorless, amorphous powder, with bitter-sweet taste, soluble in water (1 in 2) and in alcohol (1 in 50), the watery solution being neutral in reaction. It answers the various tests for its constituents; to determine the proportion of caffeine present 1 Gm. is dissolved in 20 Cc. of water and the solution shaken out three times with chloroform; the caffeine left on evaporation of the chloroform is anhydrous, and should weigh 0.44 to 0.46 Gm., corresponding to 50 per cent. of caffeine containing one molecule of water. If the caffeine obtained from the substance is dissolved in water, a little caustic alkali added, and the solution shaken out with chloroform, the whole of the caffeine should be obtained again. This shows the absence of theobromine, which is not taken out of alkaline solution by chloroform.—Pharm. Journ. and Pharmacist, May 28, 1910, 677; from Ztschr. Algem. Oesterr. Apoth.-Ver., April 2, 1910, 141.

The Crystalline Alkaloid of Calycanthus Glauca is the subject of a third paper (in combination) by H. M. Gordin, which appears in the "Proceedings," 1908, 889-891. The same author contributes a preliminary paper on

The Alkaloids of Menispermum Canadense, which appears on pp. 891-892 of the same "Proceedings."

Cocaine Chloride—Precaution When Using Chloroform Water as Solvent.—V. Zotier states that cocaine hydrochloride only gives a clear solution with chloroform water if that is prepared with distilled water. If ordinary water has been used in the preparation of the chloroform water a turbid solution is produced. The turbidity is a function of the saturation of water by chloroform, and is due to the formation of a chloroform compound of the base cocaine which is liberated by the action of the calcium carbonate of the tap water on the cocaine salt. This compound is dissociated by acids and by water. Therefore the addition of a trace of acid or 10 per cent. of water will render the liquid clear.—Pharm. Journ. and Pharmacist, Oct. 9, 1909, 451; from L'Union Pharm., Sept. 1909, 398.

Cinchona Alkaloids—New Method of Distinction.—Denigès finds that if 0.2 Gm. quinine, cupreine, cinchonine or cinchonidine are dissolved in 2 Cc. of glacial acetic acid and 2 Cc. of pure concentrated sulphuric acid then added, a faint fluorescence is distinctly visible in all cases if viewed in a magnesium light. If then 2 Cc. of formaldehyde is added, cupreine and quinine are recognized by a distinct blue-green fluorescence, cinchonine a more blue, and cinchonidine a blue-violet fluorescence. On the further addition of 3 to 4 Cc. of water, the fluorescence in the case of cupreine disappears completely, but remains in the other alkaloids, that

of quinine being in fact augmented. The further addition of water causes the gradual disappearance of fluorescence in the case of cinchonidine, but that of quinine and cinchonine remains even in much greater dilution quite distinctly visible. The author believes these reactions to serve well for distinguishing the cinchona-alkaloids from each other.—Pharm. Ztg., liv (1909), No. 97, 957; from Rép. de Pharm., 1909, No. 11.

Cinchona Alkaloids and Their Salts—Solubilities in Water.—George L. Schaefer has determined the solubilities of the four principal cinchona alkaloids, and of all their available salts, in water at a temperature of 25° C., viz.,—Quinine, and 32 of its salts; Cinchonidine, and 9 of its salts; Cinchonine, and 8 of its salts; Quinidine, and 8 of its salts. The author gives a description of the method and difficulties encountered in these determinations, and directs attention to the fact, that some of the salts are partly decomposed by water into a more soluble and a less soluble salt, which property, no doubt, has caused many of the discrepancies in previous determinations, carried out in different ways. For instance, 1 part of pure basic salt of quinine glycerophosphate of the formula $(C_{20}H_{24}N_2O_2)_2 \cdot PO_4H_2 \cdot C_3H_7O_2 + 5H_2O$ requires for complete solution about 850 parts of water of 25° C. If, however, a large excess of this salt is treated with water of 25° C. for several hours and frequently shaken, the solution filtered off from the undissolved part and tested, the salt will be found of much greater solubility, requiring even less than 200 parts of water for solution, according to time and quantity used. The remaining undissolved part, when dried and treated again with water in the same proportion and under the same condition as before, shows further decomposition, but in a lesser degree, and the solution will be found to contain considerably less of the salt than the first solution, and so on.—Amer. Journ. Pharm., April, 1910, 175-178.

Quinine Sulphate—Comparison of Pharmacopœial Tests for Purity.—Frank Tutin has made a very exhaustive study of the tests prescribed in different pharmacopœias for ascertaining the purity of quinine sulphate. The most important difference in conducting the "ammonia test," originally proposed by Kerner, as described in the U. S., French, Dutch and German Pharmacopœias, is in the preparation of the saturated solution of the quinine salt. Thus, the French Pharmacopœia states that one gramme of the hydrated quinine sulphate should be dissolved by boiling with 30 Cc. of water, after which the liquid must be cooled to 15° C. and then maintained at this temperature, with shaking, during half an hour. The Germ. Pharm. IV, on the other hand, requires 2 Gm. of the salt, dried at 40°-45° C., to be digested with 20 Cc. of water for thirty minutes at 60°-65° C., after which the mixture is cooled to 15° C., and then maintained at this temperature, with shaking, during two hours. In a similar way the aqueous solutions of quinine sulphate impurities are obtained by the U. S. and Dutch

Pharmacopœias, and they all demand that 5 Cc. filtrate should require a specified minimum quantity of 10 per cent. ammonia solution to clear up the precipitate occasioned by such addition: U. S., 7 Cc.; French, 5 Cc.; Dutch, 4.5 Cc., and German, 4 Cc., as a minimum. The author's experiments, the details of which must be consulted in the original, lead him to the conclusion that the method of applying the ammonia test to quinine sulphate, as described by the French Pharmacopœia, is to be preferred to that given by the other pharmacopœias, but that the standard of the French, as well as of the German and Dutch Pharmacopœias, are too stringent, and that a minimum of 6.0 Cc. when conducting the test according to the French method would seem a reasonable requirement. The usefulness of the ammonia test is, however, limited, and the author therefore questions whether the test of the British Pharmacopœia, for cinchonine and cinchonidine by means of purified ether, etc., is not to be preferred.—Pharm. Journ. and Pharmacist, Nov. 13, 1909, 603.

Quinine Tannates—True and False Kinds.—Biginelli points out the distinction between true quinine tannates, which are definite chemical compounds, and false quinine tannates, which are simply addition-products of tannin with quinine salts used for precipitation. In the latter, for example, the sulphuric acid derived from the quinine sulphates used may be determined in the hydrochloric acid solution of the sample.

Tasteless Quinine Tannate he now finds to be a mixture of four true quinine tannates, namely: Tetraquinine Pentannate, Biquinine Tritannate, Biquinine Tetratannate and Biquinine Pentannate. The true quinine tannates must respond to the following reaction: If 0.1 to 0.2 is moistened with moderately strong hydrochloric acid, then diluted after a few minutes with 2 to 3 Cc. of water and evaporated to dryness, the residue of evaporation should be soluble in 20 Cc. of water.—Pharm. Ztg., liv (1909), No. 74, 726; from Gazz. Chim. Ital.

Quinine and Urea Hydrochloride—Properties.—In view of the importance quinine and urea hydrochloride has recently gained as a local anesthetic and the paucity of information regarding this compound, George L. Schaefer makes some practical observations concerning its properties and gives some tests for its identification and purity. Theoretically this salt requires 50.24 per cent. anhydron quinine, 10.98 per cent. urea, 13.32 per cent. hydrochloric acid, and 16.46 per cent. water, but the preparation on the market usually contains 2 to 3 per cent. less of water of crystallization than is required by the formula: $C_{20}H_{24}N_2O_2(HCl)_2 + CO(NH_2)_2 + 5H_2O$. It crystallizes in hard and nearly colorless prisms from water and from alcohol in soft, needle-shaped crystals, but for convenience is usually supplied in form of a white powder, soluble in its own weight of water and in 2.5 parts of alcohol. Soluble in chloroform, but partly decomposed thereby; practically insoluble in ether. By prolonged heating at

125° C. the salt becomes anhydrous, and then melts almost completely at 180° C, with decomposition at about 190° C. Drugg. Circ., Febr., 1910, 55-56.

Ergothionëine—*A New Alkaloid from Ergot*.—By a circumstantial method which excludes the other associated bases, Ch. Tanret has succeeded in isolating a new base from ergot, which he has named ergothionëine—the yield from 1 kilo of the drug being about 1 Gm. When purified completely by the aid of calcium carbonate and strong alcohol, in which the base is scarcely soluble, and recrystallization from 60 per cent. alcohol, ergothionëine has the composition corresponding to the formula $C_8H_{15}N_3O_2S \cdot 2H_2O$. On drying over sulphuric acid it loses its water of crystallization, which is again assimilated on exposure to the air. It crystallizes in form of leaflets and in needles, but in the latter only in the presence of $CaCl_2$ as impurity; is soluble in 8.6 p. of cold water, freely in hot water and in weak alcohol, but very sparingly soluble in strong alcohol, in methyl alcohol and in acetone, and insoluble in ether and in chloroform. The aqueous solution of the base is dextrorotatory. It is a feeble, non-volatile base, giving no reaction with litmus, but readily forms crystallizable salts, a number of which—the hydrochloride, sulphate, hydroxide, etc.—have been prepared. They are characterized by their acid character, and give the alkaloid reactions with the usual reagents, with the exception of picric acid and tannin—the latter producing a precipitate only in very concentrated solutions of the base. When freshly prepared, ergothionëine is odorless, but on keeping it acquires a disagreeable odor. When melted with alkali and then acidulated, H_2S is evolved. Its solution when heated with KOH and chloroform acquires a green color, which on neutralization changes to blue.—Pharm. Ztg., liv (1909), No. 67, 651; from Journ. de Pharm. et Chim., 1909, No. 4.

Gelsemine Hydrochloride and Gelseminine have been subjected to further examination by L. E. Sayre, who communicates the results of his observation in a paper published in the "Proceedings," 1909, 902-903.

Guanidine Perchromate—Preparation and Properties.—According to K. A. Hoffmann and K. Buchner, guanidine carbonate yields with chromic acid anhydride and hydrogen peroxide a perchromate of the formula $CrO_5H_3 \cdot C_3N_3H_{15} \cdot H_2O$. It forms brownish-yellow prisms, which can be kept in a dry state for weeks and are not explosive. It dissolves in water, and its solution when boiled gives up oxygen and leaves a yellow solution of guanidine chromate. When treated with ether and acidified an intensely blue-colored ethereal solution of perchromic acid, CrO_5H , is obtained. From its reactions it may be concluded that guanidine perchromate belongs to the class of red perchromates for the acid of which Riesenfeld gave the constitutional formula $O_2 : Cr : (O_2H)_2$, with heptavalent chromium.—Chem. News, Oct. 22, 1909, 208; from Ber. d. D. Chem. Ges., 42 (1909), No. 12.

Jesaconitine.—*A New Alkaloid from Japanese Aconite Root*.—K. Makoshi has isolated a new alkaloid, jesaconitine, from the "Bushu" roots (Kusauzu roots of Hokkaido; *Aconitum Fischeri*, Reich.), and obtained a well-crystallized acetyl derivative from it. On hydrolysis, jesaconitine yields benzoic acid, anisic acid, and aconine. Anisic acid as a decomposition product serves to distinguish jesaconitine from all other aconite bases. The aconine is identical with that obtained from the aconitine of *Aconitum napellus*. *Jesaconitine*, from *A. Fischeri*, of Hondo, is essentially different from the jesaconitine of the "Bushu" roots. It melts at 202° to 203.5° C., while the aconitine of *A. napellus* melts at 197° C., and it is more difficult to obtain in crystalline form than aconitine. The formula attributed to it is $C_{34}H_{47}NO_{11}$.—Pharm. Journ. and Pharmacist, Aug. 7, 1909, 205; from Ztschr. de Allgem. Osterr. Apoth.-Ver., 1909, 229.

Nicotine.—*Estimation for Technical Purposes*.—The increasing use of tobacco for combating the infections on grape vines has given the incentive to F. Porchet and F. Régis to study the different methods proposed for the estimation of nicotine. Comparative experiments with Schloesing's method (extraction of nicotine by ether in the presence of sodium chloride), the method of Biel (extraction by steam and separation of the alkaloid from ammonia in form of sulphate), and that of Toth (absorption of the ammonia by calcium sulphate and direct separation of the nicotine by means of a mixture of ether and petroleum ether), have convinced the authors that the method of Toth is not alone preferable to the other two mentioned, but well adapted and sufficiently accurate for the technical purposes contemplated—the more particularly since the method excels in celerity.—Pharm. Ztg., liv (1909), No. 102, 1007; from Chem. Ztg., 1909, No. 127.

Nupharine.—*Instability*.—A. Goris and L. Crété have experimented with the alkaloid "nupharine" which Gruning has isolated from the rhizome of *Nuphar luteum*. It has the composition $C_{18}H_{24}O_2N_2$, and occurs as a friable white mass, caking when heated at 40° – 45° C., and melting at 65° C. to a syrupy condition. The hydrochloric or acetic solution of the alkaloid undergoes decomposition in a vacuum over sulphuric acid with formation of a strong and peculiarly odorous substance. As obtained by the authors from the fresh rhizome, the hydrochloric solution gives a brown precipitate with Bouchardat's reagent, an orange-red one with Dragendorff's, and a milk-white one with Mayer's reagent. Pharm. Ztg., lv (1910), No. 39, 397; from Journ. Chem. Soc., London, 97, 220–223.

Opium Alkaloids.—*Degree of Representation in the Official (Ph. Nerland) Opium Preparations*.—Marie van de Kreke and Francine Swart have determined the morphine, narcotine and codeine extracted by the different solvents directed for certain preparations of opium of the Ph. Nerland namely: Extr. opii, Tinct. opii, and Tinct. opii croc. The

results show that morphine is almost completely extracted by aqueous as well as alcoholic menstrua. The same is true of alcoholic solvents for narcotine and codeine, but these are only partially represented in aqueous extractions. Pharm. Ztg., lv (1910), No. 18, 181; from Pharm. Weekbl., 1909, 1338-1342.

Apomorphine—Contamination with Trimorphine.—Prof. Erich Harnack and Dr. H. Hildebrandt, having their attention drawn to commercial apomorphine of questionable appearance, subjected specimens of the suspected article to chemical examination. The results showed that all the samples differed from pure apomorphine, and also from each other, but that they all contained, in admixture with true apomorphine, more or less trimorphine as hydrochloride ($C_{17}H_{19}NO_3.HCl$)₂, or possibly some other polymeric form of morphine. The contaminated apomorphine is characterized as being a snow-white crystalline powder, forming faintly acid aqueous solutions which, in distinction from pure apomorphine, become barely or not at all green on standing. Physiologically this impure article differs likewise, and is believed by the authors to be responsible for most of the poisonous effects that have been attributed to apomorphine.—Pharm. Ztg., liv (1909), No. 95, 938-939.

False Apomorphine Hydrochloride—Practically Composed of Trimorphine Hydrochloride.—G. Frerichs has also examined two specimens of suspicious apomorphine hydrochloride, the one supplied by a Berlin manufacturer, the other by a Frankfort A. M. firm, and finds them to consist practically of trimorphine hydrochloride with, at most, only traces of true apomorphine. The false preparation is easily distinguished from true apomorphine hydrochloride in being non-crystalline and by its extreme solubility in water, requiring only an equal weight for solution whereas apomorphine hydrochloride requires 40 parts of water. In other respects, the pharmacopœial tests give no marked criterion of distinction, only in so far as the solution of true apomorphine in sodium hydroxide (which is incomplete in either case (darkens more rapidly than the corresponding solution of the false preparation, and that the precipitate occasioned in solution of apomorphine by sodium bicarbonate assumes a green color quite rapidly while that from the false preparation scarcely shows any change. The distinction of the two preparations on the basis of crystallinity and non-crystallinity is difficult because the false preparation, when examined under the microscope, exhibits minute snow-white, glistening aggregations, appearing colorless and transparent by transmitted light. The author describes a number of parallel reactions of the two preparations which however serve for the recognition of false apomorphine (= trimorphine) only if true apomorphine is absent. On the other hand, taking advantage of the practical insolubility of true apomorphine hydrochloride in diluted hydrochloric acid, while the false article is readily

soluble, the detection of the latter in admixture with the true article is easily accomplished as follows: 0.1 Gm. apomorphine hydrochloride, placed upon a small dry filter, is treated with 5 Cc. of a mixture of 1 p. hydrochloric acid and 4 p. water, and the filtrate tested with potassium-mercuric iodide. Pure apomorphine hydrochloride gives at most an opalescent turbidity, whereas in the presence of other alkaloids, which are soluble in hydrochloric acid, distinct precipitation results; an admixture of 10 per cent. of the false apomorphine producing an abundant curdy precipitate.—Apoth. Ztg., xxiv (1909), No. 99, 928-929.

False Apomorphine Hydrochloride—Presence of True Apomorphine.—Harnack and Hildebrandt, referring to the observations of Frerichs concerning "false" apomorphine hydrochloride (see preceding abstract), speak commendably of the hydrochloric acid test proposed by the latter for determining the presence of foreign alkaloids (and with these, of course, trimorphine) in true apomorphine hydrochloride. They contend, however, that Frerichs has overlooked the presence of true apomorphine in the preparations examined by him, and confirm this by actual experiments, which prove that the presence of trimorphine prevents the precipitation of apomorphine by hydrochloric acid within wide limitations. Thus, a crystalline precipitate of apomorphine hydrochloride results when equal volumes of concentrated hydrochloric acid and of 1 per cent. solution of a mixture of 2 parts of apomorphine and 3 parts of trimorphine are mixed; but if the relation of the two bases is 2:4, then no precipitate results at all. Experiments made with false apomorphine and pure apomorphine, mixed in certain proportions, confirmed this completely. Mixed in the proportions of 1:3, precipitation barely resulted; while larger proportions of the false preparation prevented it entirely. The authors conclude that the false apomorphine under examination did not contain much over 20 per cent. of true apomorphine. These corrections of Frerichs's findings, however, do not invalidate the test which he proposes for determining the presence of foreign alkaloids (trimorphine, etc.) with which the apomorphine is associated, since the object of the test is not to determine the presence of apomorphine, but that of the foreign bases contaminating it. Aside from other considerations, the authors emphasize that while apomorphine is emetic in its action, the pharmacologic activity of trimorphine is morphine-like, and that consequently the false article is absolutely unsuited as a substitute for true apomorphine hydrochloride.—Pharm. Ztg., lv (1910), No. 1, 6-7.

Morphine Salts—Development of Volatile Odorous Bodies.—C. Reichard having on a previous occasion called attention to the emanation of a peculiar odor during certain morphine reactions, has recently again noticed this odor during experiments undertaken for the purpose of establishing new reactions for morphine. Following up the observation experi-

mentally, he has determined that an extremely faint musk-like odor is uniformly developed when solution of morphine salts are heated, and that even the salts themselves emanate this odor when carefully heated. The intensity of the odor is increased by the concentration as well as the quantity (extent of surface) of the solution. Speculating upon the cause of this odor, the author considers it probable that it is due to the minute volatilization of the morphine salts with the water vapor, or, possibly by the formation and volatilization of free acid; but no positive deduction is at present available.—Pharm. Zentralh., 57 (1910), No. 7, 128-130.

Papaverine—Synthesis.—Goldschmidt has shown that the constitution of papaverine, which must be regarded as one of the most important of the opium alkaloids, is comparatively simple. Amé Pictet, in collaboration with A. Gams, has now succeeded in preparing it synthetically, as follows:—By the action of acetyl chloride on veratrol in the presence of aluminum chloride, *aceto-veratrol* (I) is formed, which yields with nitrous acid an *isonitroso derivatives* (II) and this is with stannic chloride reduced to *aminoaceto-veratrol chlorhydrate* (III). Then, starting with vanillin, the methyl derivatives of which yield hydrocyanic acid an *oxy acid nitrite* (IV), this yields on boiling with hydrogen iodide, removal of the methyl groups, saponification of the cyanogen and reduction of the hydroxyl, *homoprotocatechuic acid* (V), which is again methylated and converted into the *chloride* (VI). The base (III) and the acid chloride (VI) are now caused to react on each other and the product of the *combination* (VII) by reduction with sodium amalgam in alcoholic solution, maintained acid with acetic acid, is converted into the corresponding *alcohol base* (VIII). To complete the synthesis, the latter is now subjected to hydrolysis by boiling with phosphorus pentoxide in xylol solution. The papaverine so obtained proved to be identical in all respects with the natural base.—Schweiz. Wschr. f. Chem. u. Pharm., xlvii (1909), No. 40, 621-622.

Physostigmine—An Intensely Fluorescent Derivative.—F. Gaubert draws attention to a body derived from physostigmine whose red fluorescence surpasses that of all known substances. An aqueous solution of physostigmine is allowed to stand for several months until it becomes of a dark blue color. On adding hydrophthalic acid, a blood-red fluorescence is developed. The production of this color is at once a distinctive test for either substance. The crystals of this new body are deep blue in color. Meconic acid in crystals, silk, cotton, alcohol, ether, etc., are also colored blue by it, but there is no fluorescence in these cases. On the other hand, aqueous solutions of the crystals sufficiently diluted to be only faintly blue, almost colorless, by transmitted light, show by reflected natural light a red tint comparable to that of very fine rubies.—Pharm. Journ. and Pharmacist, Febr. 26, 1910, 237; from Compt. rend., Nov. 15, 1909, 852.

Scopolamine—Influence on the Action of Morphine.—A. Friedlander finds that scopolamine increases the sedative and calmative action of morphine in a remarkable manner, and renders active minute doses which, alone, would be without effect. On the other hand, morphine acts as an antidote to scopolamine; and the latter should never be prescribed with the former, so that the disagreeable effects of scopolamine, when given alone, may be avoided. Scopolamine-morphine is specially indicated for cases in which there is excitement of the central nervous system, or for the treatment of long-standing neuralgias, where secondary morphinism may result from the frequent use of morphine alone. Its use is also suggested in chronic morphinism, since it allows the dose of morphine greatly to be reduced, and that of scopolamine increased. Habitual morphinism is not likely to occur with the use of the combined injection. It must, however, be practiced under assiduous observation, with due attention to the idiosyncrasy of the subject. As a commencement $\frac{1}{30}$ grain of morphine and $\frac{1}{4}$ grain of scopolamine may be injected. When the effect of this is lessened the amount of scopolamine may be cautiously raised, then, if necessary, that of the morphine.—Pharm. Journ. and Pharmacist, Sept. 4, 1909, 319; from *Nouv. Remèdes*, 26 (1909), 295.

Strychnine.—Derivatives and Characteristic Reaction.—According to Paul Malaquin a distinct and characteristic reaction of strychnine in solution of 1 : 100000 is obtained as follows: To a mixture of 1 Cc. of the liquid under examination and 1 Cc. of pure hydrochloric acid some granulated zinc (just previously treated with HNO_3 and well washed with water) is added. After the evolution of hydrogen for several minutes, the mixture is quickly heated to boiling, cooled by immersing the test tube in water, and a substratum of concentrated sulphuric acid is introduced, when, in the presence of strychnine, a rose-red ring forms at the zone of contact of the two liquids, either at once, or after a few minutes. This color increases in intensity and finally permeates the entire liquid, which is then heated to boiling. The color so produced is permanent and does not disappear on boiling, but disappears on the addition of a few drops of 10 per cent. solution of potassium sulphocyanide, and also with an excess of ammonia—reappearing, however, in the latter case, on supersaturation with H_2SO_4 .—Pharm. Ztg., liv (1909), No. 102, 1007; from *Jour. de Pharm. et. Chim.*, 1909, No. 62.

Strychnine and Brucine—Effectual Separation in Nux Vomica Assays. In consequence of the unfavorable criticisms regarding the efficiency of the U. S. P. method of separating strychnine from brucine in the assay of nux vomica and its preparations, and the suggestion that the difficulties encountered may be overcome by the presence of nitrous acid in the nitric acid employed, G. Pinchbeck, after a considerable amount of experimental work, finds that excellent results are obtained by the employ-

ment of a solution of nitrogen peroxide in nitric acid instead of ordinary nitric acid (sp. gr., 1.42). The solution is prepared by diluting commercial fuming nitric acid in such proportion as to contain 1 per cent. of nitrogen peroxide, N_2O_5 , and not less than 70 per cent. of real HNO_3 . In the practical process, the details of which are given, the exposure of the mixed alkaloids to the action of this acid solution for fifteen minutes suffices for the complete destruction of the brucine. The particulars requiring attention in the assay are: (1) The oxidation should not be allowed to proceed beyond the time indicated, otherwise loss of strychnine occurs. (2) The strength of fuming nitric acid should be adhered to. (3) The directions regarding the final drying of the alkaloid should be observed.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1909, 327-331.

Theobromine—Determination in Theobromine-Sodium Salicylate.—E. Anneler's experiments show that the G. P. Method for determining the theobromine in theobromine-sodium salicylate does not give absolutely accurate results, the error under the most careful manipulation amounting to about 4 per cent. of the amount of theobromine found. He has tried other methods, which are more or less inaccurate within 0.1 per cent., if the following directions are carefully adhered to:—1 Gm. of theobromine-sodium salicylate is dissolved in 10 Cc. of water and rinsed into a small separator with a little more water; 3 Cc. of 10 per cent. HCl and a drop of phenolphthalein solution are added, followed by sufficient of a concentrated aqueous solution of barium hydroxide to saturate the liberated salicylic acid, until the red color of the indicator just remains perceptible after admixture. The mixture is then shaken out successively with 20, 10, 10, and 10 Cc. of a 20 per cent. solution of phenol in chloroform, drawing off the first portion after the separation into two layers, and collecting the phenol-chloroform solutions, through a small filter, in a tared glass evaporating dish. The phenol and chloroform are evaporated to dryness in a water bath and the residual theobromine, which is perfectly pure and free from barium salicylate, is weighed. The operation requires very little more time than the method directed in the German or Swiss Pharmacopœias and is preferable because more exact.—Pharm. Ztg., lv (1910), No. 20, 205.

Urea—Theoretical Relation to Formic Acid.—Paul Stoepel points out that urea and its nearest relative, carbamic acid, together with their derivatives, do not occupy the proper place in theoretical chemistry. Carbamic acid is usually regarded as the monamide and urea as the diamide of carbon dioxide, instead of with the theoretical and physiologically more closely related formic acid. Urea, and its derivatives, are more accurately defined as amido-derivatives of formic acid than, as heretofore, as amido-derivatives of carbon dioxide. Accordingly, also, ammonium carbonate with ammonium carbamate is more correctly defined as ammonium amido formate = $NH_2CO.O.NH_2$,—Apoth. Ztg., xxv (1910), No. 16, 129.

Alkyl Iodides—Action on Mercury-Ammonium Salts.—M. Zipkin finds that if ethyl iodide is left in contact with ordinary "white precipitate," NH_2HgCl , for several months, yellow crystals of a double iodide of mercury and tetraethylammonium are obtained, their composition being represented by the formula $2\text{N}(\text{C}_2\text{H}_5)_4\text{I}, 3\text{HgI}_2$; the same compound is obtained by heating white precipitate with ethyl iodide and ethyl alcohol in a water-bath together with a larger quantity of double iodide of mercury and ammonium, $\text{NH}_4\text{I}, \text{HgI}_2$. "Fusible white precipitate" $(\text{NH}_3)_2\text{HgCl}_2$, heated with methyl iodide and methyl alcohol, gives a double iodide of mercury and tetramethyl-ammonium $\text{N}(\text{CH}_3)_4\text{I}, \text{HgI}_2$, together with the double iodide of mercury and ammonium and a little ammonium chloride. Oxydimercuri-ammonium chloride, $\text{NH}_2\text{HgCl}, \text{HgO}$, heated with methyl iodide, gives yellow crystals of double iodide of mercury and tetramethyl ammonium, having a different melting-point from the compound obtained from fusible white precipitate. The production of tetra-alkyl-ammonium compounds suggests that the formulæ $\text{NH}_2\text{Cl}, \text{NH}_4\text{Cl}$ for white precipitate, $\text{NH}_2\text{Cl}, 3\text{NH}_4\text{Cl}$, for fusible white precipitate, and $\text{NH}_2\text{Cl}, \text{H}_2\text{O}$, or oxydimercuri-ammonium chloride, are more correct than those given above, which are usually assigned to them. On the other hand, when one of these compounds is dissolved in solution of sodium thiosulphate, the nitrogen is entirely given off as ammonia, whereas ammonium chloride or sal alembroth evolves no ammonia when dissolved in thiosulphate, and it therefore appears unlikely that the white precipitates contain ammonium chloride. Thus, the experiments recorded do not enable a decision to be made between the alternative formulæ.—Pharm. Journ. and Pharmacist, Oct. 23, 1909, 507; from Apoth. Ztg., xxiv (1909), No. 72, 662.

Antipyrine—A Sensitive Reagent.—Primot finds a solution composed of 1.0 vanillin, 6.0 of $\frac{1}{2}$ N hydrochloric acid and 100.0 of 95 per cent. alcohol to be an extremely sensitive reagent for antipyrine. If 1 Cc. of this reagent is added to a trace of antipyrine in a porcelain dish and evaporated on the water-bath, a deep orange-colored ring is developed, culminating in a spot of the same color. Under careful observation it is possible to detect so infinitely small a quantity as 0.00095 Mgm. of antipyrine by means of this reagent, which serves well for its detection in pyramidon, since the latter does not give the reaction.—Pharm. Ztg., liv (1909), No. 54, 530; from Bull. Scienc. Pharmacol., 1909, No. 5.

Arsen-aniline Tartrate—Preparation and Properties.—According to M. P. Yvor, arsen-aniline tartrate ($\text{C}_6\text{H}_5\text{O}_6\text{AsO} \cdot \text{C}_6\text{H}_5\text{NH}_2$) is obtained by the action of 93 p. aniline and 99 p. arsenic trioxide on a solution of 150 p. tartaric acid in 350 p. water, evaporating the solution to syrupy consistence and allowing it to coal. The new salt separates in form of greenish-yellow to rose-colored crystals (rarely white) which are anhydrous, and are isomorphous with "antimonyl-aniline tartrate (which are under "New Reme-

dies"). Arsen-aniline tartrate loses 1 mol. of constitutional water at 100°C . It is readily soluble in water, less soluble in alcohol; the aqueous solution is dextrorotatory, the deflection increasing in the degree of its concentration.—Pharm. Ztg., lv (1910), No 42, 428; from Journ. de Pharm. et de Chim., 1910, No. 10.

Basic Periodides—Formation and Properties of Some New Compounds.

—A. Linarix describes a number of new basic periodides as follows:

Tetraiodide of ethylenediamine hydroiodide, $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2 \cdot 2\text{HI} \cdot \text{I}_4$, is obtained by adding solution of iodine in potassium iodide to a solution of ethylene diamine in water containing hydriodic acid. The greenish precipitate is warmed in the mother liquor with a little added potassium iodide until dissolved. On slowly cooling fairly large grayish crystals, with a metallic aspect, separate. Melting-point, 218°C .

Tetraiodide of piperazine hydroiodide, $\text{C}_4\text{H}_{10}\text{N}_2 \cdot 2\text{HI} \cdot \text{I}_4$ is similarly prepared. It forms fine steel-blue crystals, melting at 280°C . It may be obtained either with the free base, its sulphate, or its hydrochloride. The hydrated form containing three molecules of water results from the solution of the above in potassium iodide solution. It melts at 283°C .

Tetraiodide of benzidine hydroiodide, $\text{C}_{12}\text{H}_{12}\text{N}_2 \cdot 2\text{HI} \cdot \text{I}_4$, forms black crystals with a metallic luster, melting at 298°C .

Tri-iodide of piperidine hydroiodide, $\text{C}_5\text{H}_{11}\text{N} \cdot \text{HI} \cdot \text{I}_3$, is similarly prepared with ice-cold solutions. Green crystals, melting at 45°C ., are obtained. On operating at ordinary temperatures a green oil is the result.

Tetraiodide of piperidine hydroiodide, obtained by using solutions in the appropriate proportions, cooled in a freezing mixture forms green crystals with a metallic luster, melting at 35°C .

Di-iodide of pilocarpine hydroiodide, $\text{C}_{11}\text{H}_{16}\text{N}_2\text{O}_2 \cdot \text{HI} \cdot \text{I}_2$, forms red crystals with a metallic luster, melting at 148°C . The *tetraiodide*, $\text{C}_{11}\text{H}_{16}\text{N}_2\text{O}_2 \cdot \text{HI} \cdot \text{I}_4$, gives greenish-black crystals, melting at 135°C .

Di-iodide of ethylmorphine hydroiodide, $\text{C}_{18}\text{H}_{22}\text{NO}_2 \cdot \text{HI} \cdot \text{I}_2$, gives ruby-red crystals, melting at 150°C .

Tri-iodide of xanthine hydroiodide, $\text{C}_5\text{H}_4\text{N}_4\text{O}_2 \cdot \text{HI} \cdot \text{I}_3$, occurs in small green crystals, which have no definite melting-point.—Pharm. Journ. and Pharmacist, Oct. 9, 1909, 451; from Journ. de Pharm. et Chim., 30 (1909), 241.

Quinoline Sulphosalicylate—Composition and Properties.—According to "Journ. de Pharm. et de Chim." (1910, No. 11) quinoline sulphosalicylate is obtained by the action of quinoline and sulphosalicylic acid on each other in the presence of water, forming white crystals, in silky tufts, having the composition $\text{C}_8\text{H}_7\text{SOH} \cdot \text{OH} \cdot \text{COOH} \cdot \text{C}_8\text{H}_7\text{N} + \text{H}_2\text{O}$. It conglomerates at 110°C ., losing 1 mol. of water and melts at 220°C . The salt has acid reaction, is only sparingly soluble in cold water, but readily solu-

ble in hot water and in alcohol, while in ether or chloroform it is almost insoluble.—Pharm. Ztg., lv (1910), No. 46, 472.

Quinesol—Characters and Tests.—According to F. Zernik, quinesol (neutral orth-oxyquinoline sulphate) should be a light yellow, crystalline powder, with a saffron-like odor, and a burning taste. Melting-point, 175° to 177.5° C. Readily soluble in water; sparingly so in ether. The 1:50 aqueous solution is acid in reaction; a drop of ferric chloride reagent gives an intense green color with it, and barium chloride a white precipitate. Sodium carbonate liberates ortho-oxyquinoline as a white precipitate, forming felted needles on standing. When these are collected, washed, and dried they should melt at $73-75^{\circ}$ C.—Pharm. Zentralh., 50 (1909), No. 37, 771.

Hydroxylamine—Alkalimetric Determination.—Arthur Stähler recommends the following alkalimetric method for the determination of hydroxylamine: Purified hydroxylamine hydrochloride is dissolved in water, and strongly acid titanium trichloride (or sesquisulphate) solution is added till a faint pink coloration remains after shaking. The ammonia thus formed is distilled off and received into a known volume of $\frac{N}{10}$ acid. This method can be used to determine all organic nitrogen-oxygen compounds (hydroxylamine, oximes, nitro- and nitroso-bodies) which are converted by trivalent titanium into volatile amines which can be titrated with acids.—Chem. News, Oct. 22, 1909, 208; from Ber. d. D. Chem. Ges., 42, (1909), No. 12.

Tetra Hexamethylenetetramine—Compounds with Mercury Salts.—Ed. Schmitz finds that if solutions of 5.42 Gm. mercuric chloride in 1000 Cc. water and 1.4 Gm. hexamethylenetetramine in 500 Cc. water are mixed, white needle-shaped crystals are deposited in a few minutes having the composition after washing and drying of $(\text{CH}_2)_6\text{N}_4 \cdot 2\text{HgCl}_2$. This compound is sparingly soluble in water and alcohol, but dissolves readily in water on addition of ammonium chloride, probably forming a double salt. On heating the aqueous solution above 80° C., however, decomposition sets in, HgCl_2 being deposited. The corresponding mercuric iodide compound is formed by mixing solutions of 0.9 Gm. mercuric iodide in 250 Cc. alcohol and of 0.14 Gm. hexamethylenetetramine in 50 Cc. alcohol, when, in the course of 15 to 20 minutes small yellowish-white needles will be deposited. By the use of mercuric sulphate in a similar way a hexamethylen mercuric sulphate may also be obtained.—Pharm. Ztg., lv (1910), No. 46, 471; from Ber. d. D. Chem. Ges., 1910, No. 4.

Phenolphthalein—Proposed Official Recognition as a Therapeutic Agent. Dr. P. E. Hommell, in view of the recent observations that phenolphthalein produces in ordinary doses, copious evacuations without any disagreeable by-effects, and its consequent exploitation under various names and in various combinations among physicians, suggests that this substance be

recognized in the next revision of the U. S. P. as a therapeutic agent in a satisfactory form which physicians could prescribe with the good results that are apparently obtained with the commercial specialties now offered on the market. Combinations of phenolphthalein with cascara, podophyllin, ipecac, nux vomica, etc., are suggested as giving desirable results in most cases.—Proc. N. J. Pharm. Assoc., 1909, 46-47.

Pyramidon (Dimethylaminoantipyrine)—*Error in Valuation Test of the Codex.*—The French pharmacopœia states that 0.5 Gm. of dimethylamino antipyrine dissolved in 50 Cc. of water should, after addition of a few drops of methylorange solution, require 21.75 Cc. of normal sulphuric acid solution to the beginning of the red color. Dr. P. Lemaire points out that there is an evident error in this statement, and that $\frac{N}{10}$ sulphuric acid is doubtless intended, unless the quantity of pyramidon taken should be 5.0 Gm. Furthermore that with methyl orange as indicator, 0.5 Gm. of pyramidon should require exactly 2.16 Cc. normal sulphuric acid for neutralization.—Pharm. Ztg., lv (1910), No. 38, 385; from Rép. de Pharm., 1910, No. 4.

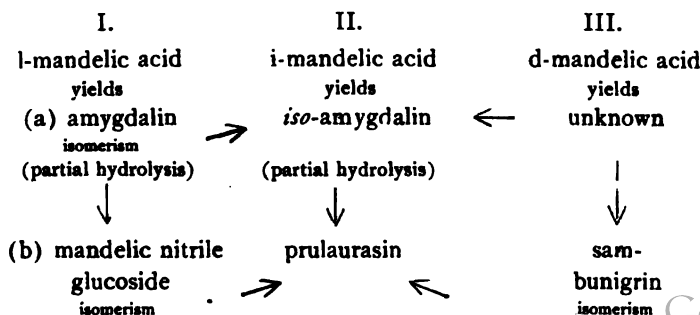
GLUCOSIDES AND NEUTRAL PRINCIPLES.

Cyanogenetic Glucosides—Classification.—In concluding their references to the recent numerous researches on the glucosides and enzymes concerned in the production of benzaldehyde and hydrocyanic acid, Schimmel & Co. mention that upon comparing those glucosides known up to the present, which when decomposed yield benzaldehyde and hydrocyanic acid, it will be found (as stated by E. Bourquelot at the VII International Congress for Applied Chemistry) that these bodies may be divided into two classes, viz., those which, when hydrolyzed, form one and those which form two, molecules of glucose:

(a) 2 mol. glucose : amygdalin and *iso*-amygdalin.

(b) 1 mol. glucose : mandelic nitrile glucoside, prulaurasin and sambunigrin.

Taking into account the rotation of the mandelic acid which is formed during decomposition, as well as the products resulting from treatment with baryta, the following table may be drawn up to show graphically the mutual relationships of the above-named glucosides:



A hitherto unknown glucoside may therefore be expected, which when isomerized with baryta yields *iso*-amygdalin, when completely hydrolyzed, *d*-mandelic acid, and when partially hydrolyzed, sambunigrin.

The isomerization of amygdalin into *iso*-amygdalin indicated in the above table was discovered in 1904 by H. D. Dakin, who obtained the conversion by treatment with diluted alkalis in the cold. Fresh communications by F. Tutin are now available, the upshot of which is that *iso*-amygdalin consists of a mixture of two glucosides, viz., amygdalin and neo-amygdalin. Tutin prepared *iso*-amygdalin from amygdalin by allowing it to stand with highly diluted ammonia. The mass having been evaporated to a very thick syrupy consistency, it was at once acetylated, without previous isolation of the *iso*-amygdalin. The heptaacetylamygdalin, recrystallized from alcohol, had a m. p. of 166° to 167° C. and a spec. rot. of $[\alpha]_D - 37.6^\circ$ C. (in chloroform). By adding a little alcohol to the crude product of acetylation, diluting the solution with ether, and extracting with water, there was obtained from the ethereal solution a product which crystallized in long, colorless needles and possessed the following constants: m. p. 174° C. (from alcohol), $[\alpha]_D - 65.6^\circ$ C. (in chloroform), $- 57.1^\circ$ C. (in acetic ester). The author calls this body heptaacetyl neo-amygdalin. The new glucoside yields, upon hydrolysis *d*-mandelic acid.—Schimmel's Semi-An. Rep., Oct., 1909, 22-23.

Amygdalin—Hydrolysis with Acids.—Up to the present no investigations had been made with the object of determining the process of the hydrolysis of amygdalin by the use of various acids. It was tacitly assumed that they would all have a decomposing action, and that, as is the case with hydrochloric acid, the glucoside, when treated with diluted acids, would yield, in addition to glucose, hydrocyanic acid and benzaldehyde, and, when concentrated acids were employed, mandelic acid and ammonium chloride. W. Walker and V. K. Kriebel have now made investigations, however, which have shown that this supposition is incorrect. They found that when amygdalin was heated for $1\frac{1}{4}$ hours with moderately strong concentrated sulphuric acid (2 Gm. sulphuric acid to 6 Gm. water) it yielded almost the theoretical quantity of benzaldehyde cyanohydrin, while, when treated with dilute sulphuric acid and heated for 2 hours at 98° C., the decomposition process was found to have only reached the stage of formation of l-mandelic nitrile glucoside. Concentrated aqueous oxalic acid solution behaved similarly to diluted hydrochloric acid. But the behavior of trichloroacetic acid was most surprising, this agent having no decomposing effect whatsoever. This is the more remarkable when it is remembered that trichloroacetic acid is almost as highly dissociated as is hydrochloric acid.—Schimmel's Semi-An. Rep., October, 1909, 23; from Journ. Chem. Soc., 95 (1909), 1369.

Aloe-Emodin—Constitution.—Aloetic acid is formed by the action of

nitric acid on aloin, and when reduced and the product diazotized and heated with alcohol, it yields aloë-emodin, which is regarded as "trioxy-methyl-anthraquinone. O. A. Oesterle and G. Riat now show that when aloëtic acid is oxidized by chromic acid, the oxidation-product reduced by means of potassium sulphhydrate and the body so obtained diazotized and heated with alcohol, a substance is obtained of melting-point $232-234^{\circ}$ C., which forms an acetate of melting-point $190-191^{\circ}$ C.; these melting-points and the analysis of the body show it to be identical with the dioxyanthraquinone which has been previously described under the name *chrysazin*. This shows that the three hydroxyl groups originally present have been reduced to two, and so supports the formula assigned to aloë-emodin by Robinson and Simonson, in which one hydroxyl is attached to the side-chain. The latter regard *alochrysin*, to which they attribute aldehyde character, as being intermediate between rhein as a carbon acid and aloë-emodin as an alcohol; but the present authors regard this assumption as incorrect, since one of the authors has demonstrated that the oxidation product of aloin designated as "alochrysin" is in reality a mixture of aloë-emodin and rhein. The authors promise to give further information concerning aloin and rhein in an early communication.—Arch. d. Pharm., 247 (1909, No. 6, 413-417.

Aloins—Character of the Hydrolytic Sugar—Aloinose.—The researches of E. Léger in 1903 (see Proceedings 1903, 969) had indicated that a sugar was produced by the hydrolysis of aloin. It was subsequently found that solutions of barbaloin in alcohol, 90 per cent., were slowly hydrolized, becoming syrupy in three years, but still being bitter. A little dilute sulphuric acid was then added, and after another two years and five months the bitter taste had completely disappeared. The syrup was then diluted with water, which precipitated aloëmodin. This was filtered out. The filtrate containing the sugar was purified by means of barium carbonate, decolorized with animal charcoal, in the cold, and evaporated to dryness *in vacuo*. The residue was taken up with absolute alcohol, concentrated *in vacuo*, and exposed over sulphuric acid. The resulting sugar, *aloinose*, could not be obtained crystalline; it forms an almost colorless, thick syrup, with a faint saccharine taste, free from bitterness. It reduces Fehling's reagent, gives the furfural reaction when heated with dilute sulphuric acid and aniline, and gives a violet reaction with hydrochloric acid and orcinol. The violet body thus formed becomes more rapidly insoluble than that given by known pentoses, such as arabinose. On adding a little ether, the precipitated coloring matter is redissolved, tinting the solution violet or wine red. On adding an excess of ether and allowing to separate, the supernatant ether remains colorless, while the lower layer becomes paler in color and ultimately changes to emerald green. The latter color is very stable, persisting for several days in a closed tube. The precipitated coloring matter gradually becomes darker, and finally is insoluble in ether.

Aloinose is a lævorotatory sugar; its $a_D = -57.3^\circ$ to 58.5° C.; it gives an osazone crystallizing in long pointed leaflets. Nataloin, when exposed for a year in alcoholic solution to the action of very dilute sulphuric acid, remains almost entirely unaffected. A small amount of sugar is, however, formed, apparently a pentose, like aloinose from barbaloin. It is to be noted that barbaloin, which is dextrorotatory, furnishes aloinose, which is lævorotatory, thus following the rule observed with other glucosides. The isolation of this sugar shows that all formulæ for barbaloin which do not allow for its formation by hydrolysis, such as that put forward by Robinson and Limonsen, are untenable.—Pharm. Journ. and Pharmacist, June 18, 1910, 759; from Journ. de Pharm. et Chim., 1910, 1, 528.

Aloin—Glucosidal Nature.—O. A. Oesterle and G. Riat have determined by their experiments that contrary to the assumption of Léger that aloin belongs to a class of glucosides which are not hydrolyzed by dilute acids, that aloin may be split up by both alcoholic sulphuric- and alcoholic hydrochloric-acid into aloë-emodin and a sugar, the precise nature of which has not yet been determined; and, furthermore, that by either method the aloë-emodin is accompanied by an uncrystallizable body, soluble in alkalies with a red color. Of the two methods, the hydrolysis of the aloin with alcoholic hydrochloric acid is preferable to that with alcoholic sulphuric acid. The observation is of importance for reliably establishing the chemical formula for aloin.—Schweiz. Wschr. f. Chem. u. Pharm., xlviii (1909), No. 47, 717-721.

Commercial Apiol—Physiological Action.—The fact that the crystalline apiol, which has been made official in the French Pharmacopœia, is practically unobtainable, has led L. Lutz to compare its physiological action with other kinds, and with essential oil of parsley. It is found that in intravenous injections all kinds of commercial liquid apiols and essential oil of parsley have almost the same toxic power; all act as vaso-dilators, and lessen the arterial blood pressure. Slowing of the cardiac contractions and an augmentation of their amplitude occurs, except with yellow apiol, which lessens the latter. The toxic dose of all is approximately 5 mils for a dog of 9 to 12 kilos. With crystalline apiol it is above 5 Gm. The diminution of the arterial pressure is much less prolonged after giving crystalline apiol than after the other kinds. White apiolin is the most active; and the essential oil is the most regular in its action.—Pharm. Journ. and Pharmacist, May 21, 1910, 646; from Bull. Sci. Pharm., 17 (1910), 7.

Crystalline Apiol—Protest Against Inclusion in the French Pharmacopœia.—Mathurin points out that nothing is definitely known of the method of preparation of "crystalline apiol" (proposed for inclusion in the French Pharmacopœia), of its posology, or of its physiological action; and it is not a constituent occurring in any quantity in French parsley

seed. Although it is prepared in Germany it is not official in the German or any other current pharmacopœia. Liquid apiol was at one time official in Belgium, but has since been deleted from the official work. The plea for its introduction, that being crystalline, it is less easily adulterated, is untenable, since from its low melting-point, 30° C., it is liquid in warm weather. It cannot be manipulated in a natural condition and has to be diluted with oil or with an excipient. It is stated that the inert residual fat which is a by-product in the manufacture of active liquid apiol has been sold as "crystalline apiol" when dissolved in oil and enclosed in capsules. Not only so, crystalline apiol is said not to be procurable in commercial quantities.—Pharm. Journ. and Pharmacist, July 17, 1909, 73; from Bull. Comm. (L'Union Pharm.), 37 (1909), 285.

Aucubin.—*Distribution in the Genus Aucuba*.—The glucoside aucubin, first isolated by Bourquelot and Herissey in 1902, from the seeds of *Aucuba japonica*, is found by C. Lebas to be widely distributed, having been isolated by the author from every species of the genus examined. The seeds of each species not being available in sufficient quantity, the entire plant was treated in each case. The following approximate percentages of crude aucubin were obtained from the species indicated: *Aucuba japonica*, var. *elegantissima*, 0.31; var. *latimaculata*, 1.96; var. *longifolia*, 1.44; var. *punctata*, 1.60; var. *salicifolia*, 1.51; var. *viridis*, 1.64 per cent.—Pharm. Journ. and Pharmacist, Dec. 4, 1909, 701; from Journ. de Pharm et Chim., 30 (1909), 390.

Cubebinic Ether.—*A Derivative of Cubebin*.—Mameli finds that when a solution of cubebin in glacial acetic acid is titrated with a dehydrating body, cubebinic ether, $C_{20}H_{20}O_8$, is formed. The best dehydrating agent for this purpose is hydriodic acid, specific gravity 1.7. After the addition of this (in quantities depending on the purity of the cubebin used), the mixture is shaken for several hours, then poured into twelve times its volume of water. A bulky white precipitate forms, and, after standing for several days, this is collected and crystallized from hot diluted alcohol. In this way it is obtained in form of handsome, white, colorless needles, having a m. p. of 78° C. and an opt. rot. (in chloroform) of $+23.04^{\circ}$. The alcohol—

Cubemamol, $(CH_2-O-C_6H_5)_2-C_6H_5OH$, is obtained by reducing this ether with alcohol and sodium. After the reaction, the mixture is precipitated with water, and the cubemamol crystallized—first from alcohol, and then from a mixture of petroleum ether and benzene. The yield is theoretical. Cubemamol forms long, white needles, having a m. p. of 92° C. and an opt. rot. (in chloroform) of $+34.81^{\circ}$.—Pharm. Journ. and Pharmacist, Sept. 25, 1909, 393; from Gazz. Chim. ital., through Journ. de Pharm. et Chim., 30 (1909), 220.

Gentiopicroin.—Occurrence in *Chlora perfoliata*, which see under "Materia Medica."

Oleuropein—Confirmation as a Constituent of Olive Trees.—E. Bourquelot and J. Vintillesso confirm their previous statement (see Proceedings, 1909, 392) as to the presence of oleuropein in the fresh organs of the olive tree, and specially in fresh green olives. The biological method of successive hydrolysis, with the ferments invertin and emulsin, indicates that by far the greater amount occurs in the young green fruits before the hardening of the stones. About one-third of the oleuropein originally present in these disappears during the process of drying; in the olives of commerce no trace remains. The sugar formed under the influence of emulsin has been isolated, and proved to be glucose. The failure of Power and Tutin to confirm the existence of the glucoside is attributed in the main to the fact that they employed the alcoholic extract of dried olive leaves as the material for investigation.—Pharm. Journ. and Pharmacist, May 7, 1910, 571; from Journ. de. Pharm. et Chim., 1 (1910), 292.

Vanillin—New Synthesis Method.—Guyot and Gry report on a new synthesis of vanillin. They condense guaiacol for a fortnight in cold glacial acetic acid solution, in the presence of zinc chloride, with mesoxalic ester or with the α , β -diketocarboxylic esters, of which the constitution is similar, such as acetyl- or benzoyl-glyoxylic ester, afterwards heating it for several hours to about 50° C. After diluting the solution with water, shaking with ether, and washing the ether with soda solution, any unchanged guaiacol is removed by means of steam and the condensation product is recovered in the crystalline form. By oxidation with acetate of copper at 80° C. these compounds can be quantitatively converted into vanilloyl-carboxylic acid, but, as regards the mesoxalic ester derivative, this can be obtained only after saponification and boiling with copper chloride. From the acid referred to, dimethyl-p-toluidin, at 170° C., splits off almost quantitatively carbon dioxide and, in contradistinction to other vanillin-processes, the result is a very pale vanillin which is free from isomerides and from resinous substances.—Schimmel's Semi-An. Rep., April, 1910, 150; from Compt. rend., 149 (1909), 928.

Strophanthin—Influence of Method of Administration on its Toxicity.—A series of physiological experiments, by J. Pédebidon, with both crystalline and amorphous strophanthins show that in all cases they are from twenty to thirty times more toxic when administered by muscular injection than when given by the mouth, and from forty-three to eighty-six times more toxic than the latter when the injection is intravenous. Consequently the last named method of administration should never be employed. The most safe and certain method of exhibiting strophanthin is by the mouth. Catillon showed in 1889 that amorphous strophanthin from *Strophanthus hispidus* is two and a half times less toxic than the crystalline glucoside from *S. Kombé*.—Pharm. Journ. and Pharmacist, Sept. 4, 1909, 319; from Compt. rend., 149 (1909), 306.

COLORING MATTERS.

Artificial Coloring Matter in Galenicals—Detection by Means of Hydrogen Dioxide.—Miss M. Paul has observed that when galenical preparations, such as syrups, tinctures, etc., prepared from vegetable drugs, are subjected to the action of hydrogen dioxide for a sufficient time (up to 48 hours), complete decoloration results, with the exception of those containing chlorophyll, which must be shaken out with benzin. This observation leads her to recommend the reaction for the detection of artificial coloring matter, such as fuchsin, Bordeaux red, Bismarck brown, etc., which are not decolorized by H_2O_2 , the method being of particular value for their detection in fruit juices and syrups.—Pharm. Ztg., lv (1910), No. 28, 283; from Journ. de Pharm. et Chim., 1910, No. 6.

Bixin—Chemical Constitution.—According to J. F. B. Van Hasselt, bixin, the red dyestuff of annatto (*Bixa orellana*), has the composition $C_{28}H_{34}O_6$; it contains one hydroxyl and one methoxyl group. It melts at $189^\circ C.$, and when heated in a current of hydrogen at $200^\circ C.$ evolves one molecular proportion of *m*-xylene, leaving a colorless residue. By the action of dilute potassium hydroxide solution on bixin, there are formed, first, potassium bixinate, $C_{28}H_{30}O_5(OK)(OCH_3)$, and then dipotassium norbixinate, $C_{28}H_{30}O_5(OK)_2$. The latter, when treated with dilute acids yields norbixin, $C_{28}H_{30}O_5(OH)_2$, a bright red crystalline substance, which decomposes at $240^\circ C.$, and can be converted into bixin by partial methylation. By the action of zinc dust and glacial acetic acid bixin and its derivatives yield dihydro-compounds; while by the action of bromine, white, amorphous, unstable compounds containing ten atoms of bromine are produced.—Pharm. Journ., Oct. 30, 1909, 537; from Chem. Weekblad., 6 (1909), 480, through Journ. Soc. Chem. Ind., Sept. 30, 1909, 975.

Chlorophyll—Conditions for its Formation.—In continuation of his studies relating to the conditions for chlorophyll formation, B. L. Issatchenko states that a low temperature ($-8^\circ C.$) does not prevent the formation of chlorophyll, and that it is formed in plants as quickly at a low temperature as at a high one, the formation of the pigment depending exclusively on the strength and duration of the light. According to other results obtained, the formation of chlorophyll continues in the presence of the vapor of formaldehyde or chloroform.—Pharm. Journ. and Pharmacist, Dec. 25, 1909, 795; from Bull. du Jardin Imper. Botanique, St. Petersburg, ix, Part v.

Chlorophyll—Comparative Examination in Different Plants.—Richard Willstätter, F. Hocheder and E. Hug have made a series of comparative examinations of the chlorophyll in different plants. The method adopted is based on the separation of the pure chlorophyll in the form of its hydrolytic product, as completely as possible, and its subsequent quantitative saponification, leading thus to the phyto-number, indicating the per-

centage of phytol in the phæophytin. This phyto-number was determined by the authors in 70 species embraced by 36 families, and proved the extraordinary distribution of phytol—the uncrystallizable chlorophyll—in plants, the presence of crystallizable chlorophyll having been determined only in five of the plants under examination. Regarding the

Reduction of Chlorophyll by Alkalies, the authors find that the first product resulting from the alcoholic saponification is *chlorophyllin*; this is then converted into the blue *glaucochlorophyllin*, then into *rhodochlorophyllin* and, finally, into two other *red* compounds, which the authors name respectively *pyrochlorophyllin* and *phyllochlorophyllin*. The nature of all of these compounds is comprehensively described and their probable chemical formulas are suggested.—Pharm. Ztg., lv (1910), No. 20, 204; from Chem. Ztg., 1910, No. 13.

Coloring Matter of Cotton Flowers—Glucoside Nature and Description.—According to A. G. Perkin, the alcoholic extract of Egyptian cotton blossoms deposits during evaporation an orange-brown precipitate of glucosidal nature. The aqueous solution of this precipitate produces with lead acetate a red precipitate, which when decomposed by hydrogen sulphide and treated with hot water yields a yellow crystalline powder consisting of a mixture of two glucosidal bodies, one of them a new glucoside of the formula $C_{21}H_{30}O_{12}$, which the author has named

Quercimeritin.—This forms yellow tabular crystals which are fairly soluble in hot water, but insoluble in cold water. It imparts to wool prepared with a suitable mordant a series of color tints, almost identical with those obtainable with quercetin and is thereby distinguished from both quercitrin and rutin. The second glucoside obtained from the crystalline mixture has been named

Gossypetrin.—It has the composition $C_{21}H_{30}O_{12}$, and occurs in form of pale orange-yellow needles.—Pharm. Ztg., lv (1910), No. 30, 304; from N. Chem. Zentrabl., 1910, No. 8.

Kaempferol—A Hydrolytic Product of Robinin.—N. Waliaschkho has made a comprehensive investigation of the glucoside *robinin* prepared from the flowers of *Robinia pseudacacia*. He has determined the formula $C_{32}H_{40}O_{19}$ for the pure, carefully dried substance, and that by the action of mineral acids on its aqueous solutions robinin is hydrolyzed with formation of 1 mol. galactose, 2 mol. rhamnose and 1 mol. of a yellow coloring matter, according to the equation: $C_{32}H_{40}O_{19} + 3H_2O = C_6H_{12}O_6 + 2C_6H_{12}O_5 + C_{15}H_{10}O_6$. This coloring matter, which in a previous investigation (see Proceedings, 1905, 830) had been named “robingenin” by the author, was subsequently regarded by Perkin as being identical with “kaempferol”—an assumption which by Waliaschkho's present investigation is completely confirmed.—Arch. d. Pharm., 247 (1909), No. 6, 447–461.

Methylene Blue—Prevention of Blue-colored Urine when Used In-

ternally.—H. Ménigault states that the persistent blue coloration of the urine voided by patients treated with methylene blue by the mouth may be prevented by the simultaneous use of iodine. He finds that if during the treatment, tincture of iodine is applied to any part of the body, and especially the spinal column, the urine emitted is no longer colored. On heating a little of this urine in a test-tube, the liquid at once becomes blue, the reason being due to the iodine having been driven off by the heat, and thus thrown out of reaction with the methylene blue. The experiment is claimed as a means of detecting the cutaneous absorption of iodine in alcoholic solution, a question which has frequently been doubted. —Pharm. Journ. and Pharmacist, Jan. 29, 1910, 109; from Bull. Commercial, Dec., 1909, 573.

Microscopic Color-Stains—Removal from the Fingers.—In microscopic manipulations with color-stains it is at times unavoidable to stain the fingers. Dr. Ernest Richter mentions in the following a number of color solutions used in microscopic work and the fluids that he has found most useful in removing the stains produced by them :

For carbolfuchsin, carbolthionin, cresyl violet (genuine), Giemsa's solution, Leishman's blood-coloring matter, Loeffler's methylen blue solution, orcein-water blue solution, and polychrom. methylen blue solution :

Use Spiritus Saponatus.

For carbolgentian violet :

Use Absolute Alcohol.

For Ehrlich's triacid solution, Esbach's reagent, and hæmatoxylin—Delafield solution :

Use Hydrogen Dioxide (3 per cent.) and Ammonia Water, equal parts.
—Apoth Ztg., xxv (1910), No. 7, 55.

ALBUMINOIDS.

(Including Animal Products).

Albumen—Color Reaction.—C. Reichard has comprehensively studied the color reactions obtainable with albumen and describes the action of acids and bases upon the dry powdered egg albumen, which, after soaking in water, gives very handsome color reactions in many instances. By the action of various metallic salts, particularly with salts of copper, he has also obtained noteworthy reactions, and interesting reactions were also obtained with vanillin and hydrochloric acid, with urea and sulphuric acid, and with phenylhydrazin, &c.—Pharm. Zty., lv (1910), No. 16, 158–160.

Albumen—Determination in Urine.—T. Morikawa recommends the following simple method for determining the presence of albumen in urine :—The urine is diluted with two or three times its volume of water, and 5 Cc. of the mixture is poured into a test tube, followed by 3 Cc. of solution

of potassium iodide and 2 drops of 36 per cent. acetic acid. In presence of 0.01–0.02 per cent. of albumen a white ring will develop at once at the zone of contact of the two layers, while with 0.005 per cent. the ring manifests itself in about 2 minutes.—Pharm. Ztg., liv (1909), No. 63, 612; from Ztschr. d. Allg. Oesterr. Ap.-Ver. 1909, No. 29.

Albumen—Modification of Esbach's Method of Estimation in Urine.—Kwilecki recommends the following modification of Esbach's method of estimating albumen in urine, whereby the time for carrying out the test is shortened from the entire day usually required to from two to at most six minutes, depending on the amount of albumen present. The apparatus is filled to the mark with the urine—which must be acid: 10 drops of 10 per cent. solution of ferric chloride are added, mixture is effected by gentle agitation, and Esbach's solution is then added to the required mark. The container is then well corked and the contents mixed by shaking, not too violently. Meanwhile water having been heated to about 72° C., in a vessel specially constructed for the container, the latter is introduced after removing the flame, observing that the water shall reach about 1 Cm. higher than the reacting mixture. The latter clarifies rapidly; the albumen subsides, and its amount may be read off within the short period above mentioned.—Pharm. Ztg., liv (1909), No. 55, 538; from Münch. Med. Wschr., 1909, No. 26.

Albumen—Simple and Reliable Method of Determination in Urine.—Having in numerous instances observed that the usual tests for albumen in urine may be misleading and under certain conditions yield very different results, Dr. Fr. Engel has made a comprehensive series of experiments which lead him to recommend, as one of the most convenient and reliable methods, the well-known method of boiling the urine, with the *subsequent addition of diluted acetic acid*—the urine being heated in the upper part of the test-tube. For confirmation, if deemed necessary, the acetic acid-ferrocyanide test may also be made; but all tests depending on the *preliminary addition of acids* should be rejected.—Pharm. Ztg., liv (1909), No. 98, 968; from Deut. Med. Wschr., 1909, No. 47.

Albumen—Two New Reactions.—Y. Oguro describes two new reactions for albumen in urine which, in spite of the already large number that have been proposed, deserve attention. The *first* is obtained by acidulating 5 Cc. of the urine with a few drops of acetic acid, adding 1 Cc. tincture of iodine, and following this with the addition, drop by drop, of saturated solution of sodium bisulphite until the brown color of the solution disappears. In the presence of albumen the decolorized mixture exhibits a white turbidity.—For the *second* reaction tincture of iodine decolorized with exactly the necessary quantity of saturated solution of bisulphite is used. To 6 Cc. of the clear urine, strongly acidulated with acetic acid, 2 Cc. of this reagent are added. In the presence of albumen, white pre-

cipitate or turbidity is produced immediately or after a short while. Both reactions are characteristic for albumen, and are available for dilutions of 1 : 120000.—Pharm. Ztg., lv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

Human Blood—Simple Method of Differentiating.—T. Tiorkowsky differentiates human blood from that of the lower animals by the following simple method:—Into a test-tube, about 6 Cms. long and 8 Mm. in diameter, 1 Cc. of hydrocele liquid or human blood serum (the former is preferable) is introduced. In another vessel, a drop of the fresh blood to be examined is diluted with 10 to 50 drops of water. This latter liquid is carefully poured into the test-tube containing the serous liquid in such a way as to form a layer. If the blood is of human origin there is formed in about half-an-hour a faintly red-colored precipitate of coagulated blood, while the supernatant liquid remains clear. Operating in the same way with the blood of any of the lower animals, no precipitate is formed, and the liquid is colored red. Dry blood is first dissolved in physiological salt solution before applying the test.—Pharm. Journ. and Pharmacist, Aug. 14, 1909, 240; from Gaz. Medic. de Paris, June 1, 1909, 11.

Milk—Home Pasteurization.—L. A. Rogers makes some practical suggestions regarding the home pasteurization of milk, which may be done with the simplest outfit. Milk is most conveniently pasteurized in the bottles in which it is delivered. To do this use a small pail with a perforated false bottom. An inverted pie tin with a few holes punched in it will answer this purpose. This will raise the bottles from the bottom of the pail, thus allowing a free circulation of water and preventing bumping of the bottles. Punch a hole through the cap of one of the bottles and insert a thermometer. The ordinary floating type of thermometer is likely to be inaccurate, and if possible a good thermometer with the scale etched on the glass should be used. Set the bottles of milk in the pail and fill the pail with water nearly to the level of the milk. Put the pail on the stove or over a gas flame and heat it until the thermometer in the milk shows not less than 150° nor more than 155° F. The bottles should then be removed from the water and allowed to stand from twenty to thirty minutes. The temperature will fall slowly, but may be held more uniformly by covering the bottles with a towel. The punctured cap should be replaced with a new one, or the bottle should be covered with an inverted cup.

After the milk has been held as directed it should be cooled as quickly and as much as possible by setting in water. To avoid danger of breaking the bottle by too sudden change of temperature, this water should be warm at first. Replace the warm water slowly with cold water. After cooling, milk should in all cases be held at the lowest available temperature.—Druggists' Circular, Nov., 1909.

Milk—Decomposition of Carbonophosphates by Pasteurization.—Ac-

according to the investigations of A. Barillé, milk contains an unstable calcium carbonophosphate, which is decomposed by the process of Pasteurizing with the precipitation of calcium carbonate and dicalcic phosphate and liberation of carbonic acid gas—that is, the natural soluble phosphate compound is rendered insoluble. Although the amount of calcium phosphate thus rendered less easily assimilable in Pasteurized milk is small, and probably negligible from the point of view of alimentation of adults, this cannot be the case in milk used for the artificial rearing of infants. It is suggested that possibly sterilization by means of light might be substituted for Pasteurization for such milks. This treatment does not affect the calcium carbonophosphate, and the milk thus sterilized appears to be identical, in all respects, to “living” milk.—*Pharm. Journ. and Pharmacist*, Sept. 18, 1909, 365; from *Compt rend.*, 149 (1909), 356.

Milk and Butter—Rapid Detection of Boric Acid.—E. Gauvry proposes a method for detecting boric acid in milk and in butter, which is based on the deep red coloration given by boric acid with turmeric in presence of oxalic acid. About 10 Gms. of butter is vigorously shaken in a suitable vessel with 20 to 25 Cc. of water sufficiently hot to melt the butter; when the fatty layer separates the aqueous portion is filtered through a dry filter into a centrifuge tube; to the filtrate, 7 or 8 drops of baryta water and about 10 Cc. of alcohol are added. The whole is allowed to stand for several minutes, and then centrifugated; the liquid is decanted and 1 Cc. of a hot concentrated solution of oxalic acid is poured on to the precipitate remaining in the bottom of the tube; the barium oxalate dissolves in the excess of oxalic acid, and is re-precipitated by the addition of a sufficient quantity of alcohol. The liquid is again centrifugated, the clear portion decanted into a white porcelain capsule evaporated on a water-bath, not above 85° C., after having added a few drops of tincture of turmeric. A red coloration of the residue indicates boric acid, and the reaction will detect 0.1 Mgm. of the acid with ease. The coloration varies from rose to vivid red, and its intensity is proportional to the amount of the acid in the butter. In the absence of borates, the coloration obtained is pale yellow. For milk the ash is used; it is taken up with a drop of hydrochloric acid and a few Cc. of tepid water. This is treated with baryta water and the process carried out as described.—*Pharm. Journ. and Pharmacist*, Febr. 19, 1910, 205; from *Annal. de Chim. Analyt.*, Jan. 15, 1910, 14.

Soured Milk—Preparation by the Pharmacist.—The therapeutic application for “soured milk” has created a new demand upon the pharmacist, which Ernest C. Cripps illuminates by some pertinent remarks. He says there are apparently still some pharmacists who are not alive to the possibilities of business due to the wave of enthusiasm spreading over the country, principally caused by the medical profession ordering for indigestion

and other stomach and intestinal troubles what is popularly known as "soured milk." It is quite possible for many to make "soured milk" and supply it regularly to those requiring it. The public certainly prefer it made by the pharmacist than by the dairyman, for the process needs most scrupulous cleanliness, and also a temperature that does not vary more than a few degrees. Both of these requirements can be met by the pharmacist. The apparatus need not cost much. A few pots and sauce-pans, and a source of heat that will maintain a constant low temperature—these can be improvised by any ingenious worker. The necessity for the most rigid precautions as to cleanliness must, of course, be insisted upon. All utensils should be either boiled or dipped into boiling water, and allowed to drain dry, as if wiped by a duster, no matter how clean it may appear, germs are introduced. The bottles in which the finished product is sent out to customers, must be filled fitted with a good cork or rubber lining to the tin cap. Incidentally, a very good demand is arising for the many lactic acid producing tablets, liquid cultures, "machines" and apparatus for home production of "soured milk." No great stock of these need be carried, but the pharmacist should be in readiness to supply them. It is also noted by the author that properly prepared "soured milk" should contain 2 per cent. of lactic acid and should produce a distinct acid reaction with litmus paper.—Pharm. Journ. and Pharmacist, Jan. 22, 1910, 78.

Soured Milk—Production with Preparations of Lactic Acid Bacilli.—E. Quant contributes some observations on the commercial preparations of lactic acid bacilli. Working on two English and two Continental brands of tablets and a milk culture, he shows that lactose has no influence on the acid production, and considers that the disappointments which have been expressed in the preparation of sour milk are due (1) to employing insufficient bacterial substance, (2) to inefficient temperature. The night lights of some of the popular apparatus have been found to give a temperature varying 15° F. The author recommends the use of a moist culture to obtain the best results, and cultivating for at least four hours between 105° and 110° F., the growth of adventitious organisms being thereby inhibited, and an amount of lactic acid quickly produced to retard their subsequent development.—Pharm. Journ. and Pharmacist, Jan. 29, 1910, 109; from Brit. Med. Journ., Dec. 18, 1909, 1736.

T. D. Luke confirms most of the observations in Quant's paper above quoted, and now adopts milk cultures for the

Preparation of Soured Milk.—He finds that with a temperature of 108° to 110° F., a very pleasant curdled milk is obtained in about five hours. He replaces the simple tin apparatus and night-light by a wooden box, about 2 ft. by 2 ft. by 3 ft., lined with asbestos and fitted with a metal tray, sliding out, and placed over two 8-candlepower electric lamps, with the thermometer passed through the top of the box, as in a bacteriological oven. The front side of the box falls down by means of a hinge,

allowing the removal of the metal tray, which will hold some thirty glasses of milk. The front is fitted with a little sliding door about 2 in. by 8 in., and by means of this a supply of cooler air is regulated to keep the box from getting too hot.—*Ibid.*; from *Brit. Med. Journ.*, Jan. 1, 1910, 52.

Buttermilk—Preparation from Sweet Milk by Means of Lactic Acid Bacteria.—F. W. Nitardy gives a method for preparing lactic acid cultures, and by the aid of these "buttermilk" from sweet milk, in "Proceedings," 1909, 1138–1139.

Yoghurt—Preparation.—Henneberg comprehensively discusses the nature of the ferments concerned in the preparation of yoghurt, and recommends a method for its preparation. Operating with pure cultures obtained from original Oriental yoghurt, he finds them to consist of three milk ferments: *Bacillus bulgaricus*, *Streptococcus*, and *Bacterium lactici, acidi*. The first of these, by frequent transmission, suppresses the other two in the preparation of yoghurt. Both pure cultures and ordinary cultures can be supplied (by the "Institut für Gärungsgewerbe, Berlin, ?), the latter, if used without delay, being practically quite as efficient as the pure cultures. The cultures are added to sterilized milk at 45° C.; or a little of the previously prepared yoghurt (which has been preserved at from 30°–40° C.) is added to the milk. As soon as coagulation is completed (usually in 4 to 6 hours) the acidulous milk (yoghurt) is set aside in the cold, ready for use.—*Pharm. Ztg.*, liv (1909), No. 102, 1005; from *Ztschr. Spir. Ind.*, 1909, 489.

Powdered Milk—A Useful Commercial Product.—Prof. Joseph Feil, in a paper entitled "The Drug Store Cow," speaks interestingly on the subject of milk, evaporated milk, powdered milk and milk foods. In regard to powdered milk he says that this is a recent addition to milk products, mostly made from skim or "centrifuged" milk, with the addition of variable quantities of butter fat. It is made to a large extent, by two patented processes. One method is to spray the milk in a very fine stream, under pressure, into a large room having a current of dried air passing through it: the other method involves the use of a revolving cylinder, heated to about 180° F. by steam, on which the milk is spread in a thin stream, and in twelve seconds or half a revolution is so well dried that it contains only one per cent. of water. It is mechanically scraped off and then immediately powdered. This product is used extensively by bakers, but would seem to be useful in pharmacy for preparing emulsions, infants' and invalid's food, malted milk, etc. The average composition of the powdered milk at present on the market is as follows:

Milk sugar	49.35
Protein	33.84
Fat	1.73
Ash	6.87
Water	8.16

The author also makes some interesting observations respecting the so-called "Butter-Milk Tablets" which, as supplied by the manufacturers and used according to their directions yield anything but the real Metchnikoff product.—Proc. Ohio State Pharm. Assoc., 1909, 56-59.

Emulsin-Hydrolysis—Retarding Action of Certain Substances.—A. Fichtenholz finds that gallic acid, hydroquinone, and tannin all exercise a retarding influence on the hydrolysis of glucosides by emulsin; but this influence, which in some cases goes so far as absolutely arresting the action of the ferment, varies in the different glucosides. *Hydroquinone* markedly retards the action of emulsin on arbutin, but has only a relatively slight retarding action on the emulsin-hydrolysis of salicin, gentiopicrin, and amygdalin. *Gallic acid* entirely stops the emulsin-hydrolysis of arbutin, and greatly retards that of aucubin, while with other glucosides it is variable and less marked. *Tannin* retards but does not absolutely arrest the emulsin-hydrolysis of arbutin; it retards the action of emulsin on other glucosides, but not precisely in the same degree as gallic acid.—Pharm. Journ. and Pharmacist, Sept. 25, 1909, 393; from Journ. de Pharm. et Chim., 30 (1909), 204.

Salicase—An Enzyme of Salix Purpurea.—T. Weevers has previously studied the glucoside salicin present in the twigs of *Salix purpurea* as a reserve product, with reference to the physiological significance of some glucosides, and had observed that when the shoots start growing the salicin gives place to saligenin, and this apparently to catechol. He now reports the discovery of the enzyme, *salicase*, which decomposes salicin. Further, he identifies two oxidation ferments, which act upon saligenin and catechol respectively. These and other results lead to the following argument: During the summer, salicin is formed in the leaves by day, but is decomposed by night, and the glucose is transported to the cortex; each day the catechol combines with more glucose to form salicin. In the autumn the process ceases, because the cortex contains as much salicin as the leaves. These conclusions agree with the hypothesis that benzene derivatives combine with carbohydrates to form substances which diffuse with difficulty, and that serve to keep the sugar stored in the tissues.—Pharm. Journ. and Pharmacist, Febr. 12, 1910, 173; from Recueil Trauvaur botaniques Neerlandais, Vol. V.

Digestive Ferments—Use in Medicine.—Dr. C. G. Stockton says that different foods require for their hydrolysis the attack of different sorts of ferments, and the organism is provided with a variety of these secretions. The several ferments operate unfavorably on each other. Thus, ptyalin acts for the most part in the stomach previous to the free secretion of acid gastric juice, which inhibits the ptyalin; and the gastric ferments, in their acid medium, are in turn made inactive through the secretions entering the duodenum. It will thus be seen that the administration of digestive

ferments as medicaments is open to physiological objections. Ptyalin, certain pancreatic preparations, and some of the diastases are possessed of a certain amount of power in the conversion of starch into maltose and dextrin when thoroughly mixed with carbohydrate food at the time of ingestion. Practically the activity of all these substances ends as soon as the gastric secretion has become mixed with the stomach contents. The author is unable to satisfy himself that intestinal digestion is improved by the administration of any ferments whatever. In the case of malt extracts and other forms of diastase, it is difficult to determine how much improvement in digestion is subjective, and how much of it owing to the extractive matter, bitter, or aromatic substances which may accompany the ferments in question. On the whole it must be concluded that the question of the administration of digestive ferments in medicine is complicated and is rendered the more uncertain by lack of precise knowledge as to what becomes of them in the digestive canal. There can be no question that a large number of preparations which have been placed on the market are practically inert. Many combinations that are widely advertised, and presumably largely prescribed, are self-destructive, provided they are made as represented. That is to say, the various elixirs, etc., said to contain pepsin, pancreatin, hydrochloric acid, lactic acid, vegetable diastase, etc., are not only unphysiologic in theory, but by careful analysis made by the Council on Pharmacy and Chemistry of the American Medical Association have been shown to be practically worthless so far as digestive activity is concerned. *Journ. Amer. Med. Assoc.*, Nov. 20, 1909, 1703.

Papain—Digestive Properties.—The experiments of Pozerski show that papain digests albumin with extraordinary rapidity at high temperatures; the maximum action appears to occur between 80° and 95° C. It is only necessary to bring to a boil a mixture of ovalbumin or serum and a suitable quantity of papain to transform most of the albuminoids into albumoses or peptone. Papain has the special property of attacking albuminoids at the moment when they are losing their natural properties. Egg albumin and serum are progressively attenuated, at ordinary temperatures, by papain, but are not actually digested until heated. Animal tissues in a natural condition and vegetable albuminoids undergo rapid digestion at a high temperature.—*Pharm. Journ. and Pharmacist*, July 24, 1909, 105; from *Ann. Inst. Pasteur*, through *B. M. I.*, 1909, 2, 3.

Pepsin—Inefficiency of the G. P. Method of Valuation.—Dr. Kehler calls attention to some defects in the German pharmacopœial method for the examination and valuation of pepsin. He finds that both the temperature (45° C.) and the time of exposure (one hour) directed in the G. P. are too low, and speaks commendably of the requirements of the U. S. P. in these respects, viz., a temperature of 52° C. and an exposure to that temperature for 2½ hours, which he finds experimentally to yield satisfac-

tory and reliable results. The direction of the U. S. P. also, to immediately cool down the reacting mixture by the addition of cold water at the end of the time limit, is recommended. Regarding the character and frequency of shaking the reacting mixture, he considers violent or frequent shaking to be a disadvantage. Gentle rotation of the mixture at intervals of a quarter of an hour is regarded as being most efficient.—Apoth. Ztg., xxv (1910), No. 27, 230.

Pepsin—Stability of the Peptonizing Power of the Liquid Preparations.

—A. Petit and A. L. Petit report the results of experiments extending over a period of more than six years, undertaken for the purpose of ascertaining the changes in the peptonizing power of liquid preparations of pepsin—such as elixirs, wines, etc.—by prolonged keeping. These results, in contradiction to those recorded by Thibault in 1881, prove that these preparations retain practically their full digestive power for years, and that, while here and there it was possible to determine a diminution in the peptonizing effect, this was so slight as to be practically negligible. The authors account for the unfavorable results of Thibault, on the ground that in his experiment the hydrochloric acid solution of pepsin was heated for one hour at 50° C. before adding the fibrin, which, in the experience of the authors wholly, or at least partially, destroys the peptonizing power of the pepsin.—Pharm. Ztg., lv (1910), No. 19, 189; from Journ. d. Pharm. et Chim., 1910, No. 4.

Pepsin and Pancreatin—Their Chemistry and Uses. These are ably discussed in a paper contributed by Bernard Sacks, M.D., at the Los Angeles meeting, which appears in the "Proceedings," 1909, 1122–1131.

Pancreatic Ferments—Action of Heat.—According to E. Choay, the pancreatic diastases, in a dry condition, may be heated to 80° or 100° C. for one or two hours without their diastasic power being materially affected. At a temperature of 120° C., however, the proteolytic, amylolytic, and steaptasic ferments are paralyzed, the amount of inhibiting action being directly proportional to the period of exposure. In the moist state these ferments are very sensitive to the action of heat, even exposure to 40° or 50° C. in a partial vacuum, such as is employed in the commercial preparation of dry pancreatic preparations, being sufficient to reduce the activity of the amylolytic diastase by 75 per cent., and that of the steaptasic ferment by 50 per cent.—Pharm. Journ. and Pharmacist, Febr. 26, 1910, 238; from Journ. de Pharm. et Chim., 1910, 1, 20.

Gelatin—Color Reaction.—R. E. Liesegang finds that if a mixture composed of 1 Cc. of 10 per cent. cupric chloride solution and 14 Cc. of 40 per cent. K_3PO_4 solution is added to a 10 per cent. solution of gelatin, the jelly and the liquid assume after 24 hours a deep violet color, whilst the green precipitate of cupric phosphate initially formed gradually diminishes.—Pharm. Ztg., lv (1910), No. 38, 283; from N. Chem. Zentral-Bl., 1910, No. 8.

Gelatin—Superficial Impurities.—In the course of some practical observations on the commercial forms of gelatins and their uses. J. A. Forret directs attention to extraneous impurities derived from the netting on which sheet gelatin is dried. These sheets bear the markings of the netting which in some brands are more or less covered with short lengths of very fine fibers, indicating that the netting used for drying the sheets had been made of rope or cord; while in others the markings are free from adherent matter, the sheets having apparently been dried on wire netting. While for most purposes the presence of a small proportion of innocuous matter, such as the fine fibers referred to, is negligible, when purity and the highest brilliancy in the finished articles are required, gelatin ought always to be washed before it is used.—Pharm. Journ. and Pharmacist, March 5, 1910, 292.

Commercial Clavin—Composition.—D. V. Vanslyke has examined a sample of Vahlen's commercial clavin. It contained 36 per cent. of ash, chiefly as phosphates of the fixed alkalies, and when purified by precipitation and recrystallization it yielded 55.5 per cent. of ash-free clavin. It proved to be a mixture of leucin, isoleucin, and valin, the respective percentages being 39.1, 22.3, and 37.1. A study of the pharmacological effects of these individual amino-acids is contemplated, in order to determine whether any of them has the specific action of causing contraction of the uterus, as claimed for clavin by Vahlen.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 671; from Journ. Pharmacol. and Experim. Therap., Aug., 1909, 265.

Lecithin—Estimation of Purity.—A simple method of estimating the purity consists according to Mario Morigi in emulsifying the sample with water. A yellowish emulsion indicates impurity, due mainly to fat. A translucent sample indicates the presence of excessive solvent remaining from its preparation. Phosphates and glycerophosphates are frequent impurities. The relative proportions of P to N are about those of their atomic weights: 31 to 14. A material deviation from this proportion must therefore be regarded as due to impurity.—Pharm. Ztg., lv (1910), No. 11, 108; from Chem. Z.-Bl., 1909, No. 26.

Nucleinic Acid—Properties.—F. Sauerland has prepared and examined sodium nucleinate from calves-thymus and free nucleinic acid from herings' sperm and found by qualitative and quantitative tests only minute impurities in the products consisting of 0.02 to 0.03 per cent. of Fe, from which he concludes that *pure* nucleinic acid must be free from iron. The same result was obtained with a pancreas nucleoproteid obtained by Hammarsten's method.—Pharm. Ztg., lv (1910), No. 29, 291; from N. Chem. Zentral-Bl., 1910, No. 8.

Cholesterol—Combination with Saponins.—It has been shown by Ransom that if cholesterol is added to saponin, the latter loses its property of

dissolving blood corpuscles. The compound which is formed has now been studied more closely in the case of digitonin by A. Windhaus. On mixing an alcoholic solution of this saponin with an alcoholic solution of cholesterol, a precipitate of fine crystals falls at once, and this is found to consist of a compound of the two in molecular proportions, no water being eliminated in their union. Many other bodies besides cholesterol were found to form similar compounds; those examined included phytosterol, stigmasterin, coprosterin, β -cholestanol, linalol, geraniol, sabinol, amyl alcohol, and octyl alcohol. Certain other saponins were tried in place of digitonin, and found to give similar compounds.—Pharm. Journ. and Pharmacist, Nov. 27, 1909, 671; from Ber. d. Chem. Ges., xlii (1909), 238, through Nouv. Remèdes, Sept. 24, 1909, 420.

Cholestrin—Benzoylsuperoxide as Reagent.—Lipschütz finds that benzoylsuperoxide may not alone be used with advantage for the determination of formaldehyde, but also for the detection of cholestrin, by manipulating as follows: A few fragments of benzoylsuperoxide are added to a solution of several milligrams of cholestrin in 2–3 Cc. of glacial acetic acid and heated to boiling, then cooled. When cool, a few drops of concentrated H_2SO_4 are added, which settle to the bottom of the test-tube and assume a blue-violet to blue-green color. On vigorously shaking the mixture, the mixture assumes after a short time, depending on the quantity of the benzoylsuperoxide present, an immediate green color, or becomes violet, then fine blue, appearing violet by transmitted light, and only turns pure green after prolonged standing.—Pharm. Ztg., lv (1910), No. 43, 436; from Merck's Annual Rep., April, 1910.

Keratin A and B—Soluble and Insoluble Forms.—Commercial keratin has heretofore proven disappointing for the intended purpose—pill coating—because it has not proven insoluble either in water or in the juices of the stomach. L. Golodetz has, however, now found a method which leads to the production of a satisfactory preparation. According to the statement of the author this method consists in treating horn chips with ammonia under a pressure of four atmospheres, which results in the separation of the horn substance into *Keratin A* and *Keratin B*. The latter, after purification from associated albumen, furnishes a suitable material for pill coating, for which purpose it is dissolved in ammonia solution.—Pharm. Ztg., lv (1910), No. 42, 436; from Merck's Annual Rep., April, 1910.

Creatinin—Colorimetric Estimation.—A. C. Chapman has studied Jaffe's colorimetric method for the estimation of creatinin, and finds that the red coloration on which this method is based depends, not on the formation of creatinin picrate, but on the reduction of the picric acid in alkaline solution to a mixture of amido-dinitro-phenol (picramic acid) and diamido-nitrophenol, the alkaline salts of which are deeply colored. The same coloration is produced by numerous reducing agents, such as nascent

hydrogen, hydroxylamine, acetone, aldehyde, ammonium sulphide and titanium trichloride. Creatinin acts as a powerful reducing agent, and if it is present in excess, the picric acid may undergo reduction and colorless triamido-phenol be formed. The red coloration is due to both the mono-amido and diamido phenol, and solutions of the sodium salt of picramic acid cannot be used for matching purposes. Since the coloration is due to a somewhat complex reducing action, the conditions under which the test is carried out must be fairly closely defined if accurate results are to be obtained. The factor of temperature is of importance, as up to a certain point the color is increased, after which there is a reduction due to the formation of triamido-phenol. With regard to time, slight differences have no appreciable influence. In the cold, and under the ordinary conditions of the test, the presence of dextrose is not prejudicial. The author emphasizes the necessity of working with sufficiently diluted solutions.—Chem. News, Oct. 8, 1909, 175.

Choline—Possible Errors Regarding its Presence in Animal Fluids and Tissues.—W. Webster says that several investigators have identified choline as a substance to be found in increased quantities in the blood or cerebro-spinal fluid in animals or patients with degenerative processes going on in their nervous systems. The author points out the various errors on which these and similar statements are based, and shows that with our present methods of chemical analysis there is little hope of detecting the very minute quantities—small fractions of a milligram—of choline that might be set free from degenerating nervous tissue, and so get into the circulating blood of man or of animals, in disease of or after operations on the nervous system. He finds that no choline can be detected in normal blood provided that the lecithin in it is prevented from decomposing. It may be noted that Kauffmann in 1908 could isolate no choline from a liter of cerebro-spinal fluid collected from various patients with nervous diseases. The author further finds that the amount of choline or of potassium salts that might be set free into the circulation by even sudden processes of degeneration in the nervous system would be too small for detection; and that the microchemical reactions given for choline occur irregularly but equally freely by both normal and pathological cerebro-spinal fluid, while it is doubtful whether any of the microchemical tests in use are specific for choline.—Pharm. Journ. and Pharmacist, Aug. 14, 1909, 240; from *Bio.-Chem. Journ.*, 1909, iv, 117.

Adrenalin—A New Characteristic Reaction.—Fränkel and Allers have observed that if solutions of adrenalin are warmed with iodic acid, or with the acid potassium iodate and diluted phosphoric acid, a magnificent rose-red color (or eosine red in extremely dilute solutions) is developed, changing to red-brown on addition of ammonia. The reaction is extremely delicate, being obtained with adrenalin solution 1 : 300,000, and is

available for its recognition and differentiation from kindred substances which, as determined experimentally, do not give the reaction.—Pharm. Ztg., liv (1909), No. 54, 530; from Biochem. Ztschr., xviii (1909), 40.

Lævo- and Dextro-Suprarenin—Comparative Physiological Action.—According to E. Abderhalden and F. Thies, the physiological action of lævo- and dextro-suprarenin is differentiated as follows: Dextro-suprarenin, when applied to the pupil of the frog's eye, produces no mydriasis; lævo-suprarenin in similar doses produces a marked and characteristic dilatation. Any slight action in this respect that dextro-suprarenine may show is due to the presence of a trace of the lævoglyre form. Similarly, dextro-suprarenin fails to produce glycosuria when administered in such doses as cause a marked excretion of sugar in the case of lævo-suprarenin.—Pharm. Journ. and Pharmacist, Dec. 25, 1909, 795; from Nouv. Remèdes, 26 (1909), 372.

Parathyroids in Man—Functions.—The "Lancet" (Jan. 8, 1910, 112) makes the following observations regarding the functions of the parathyroids in man: There are usually four parathyroids in man, two on each side, situated in front of the vertebral column just behind the posterior margins of the lateral lobes of the thyroid gland. They are reddish-yellow or reddish-brown in color, and their size and shape correspond to those of a small grain of Indian corn. They are in close relation with the inferior thyroid artery, from which they usually derive their blood-supply. Investigations have shown that when the parathyroids are diseased or injured a peculiar condition of tetany frequently results. The cells of the bodies are different from those in the thyroid, and they form a colloid material which unlike that of the thyroid, does not contain iodine. Professor Ott and Dr. Scott find that removal of the parathyroids causes tetany, that there is a co-operative action between the parathyroids and the pituitary body and that tetany is not due to want of calcium, as some writers have maintained, but to a poison in the blood, the calcium changes being only an epiphenomenon. The tetany can be greatly benefited by pituitary extract, calcium and strontium salts, and by parathyroid extract, and the grafting of a parathyroid is a cure for tetany. A nucleoproteid separated from the bodies is a powerful diuretic, and increases uterine contractions and intestinal peristalsis. The tetany of pregnancy, due to parathyroid insufficiency, can be relieved by parathyroid treatment. A writer draws attention to the difficulty in obtaining sufficient of the extract for investigation, and he insists that satisfactory results can only be obtained by the use of extract made from parathyroid tissue alone, a matter which means that a microscopical examination of every minute gland used in making the extract is absolutely necessary.—Pharm. Journ. and Pharmacist, Jan. 29, 1910, 109.

Tetanus Antitoxin.—In a contribution of John F. Anderson, Assistant

Director of the Hygienic Laboratory of the U. S. Public Health and Marine Hospital Service, he advances some reasons why tetanus antitoxin should be admitted into the next U. S. P., the conditions under which this can be done being identical with those which permitted the admission of diphtheria antitoxin into the present U. S. P. This paper appears in the "Proceedings," 1909, 786-788.

Urine—Direct Detection of Acetone.—Bardash recommends the following direct method for the detection of acetone in urine, which is not interfered with by the presence of albumen, sugar, biliary or urinary pigments, oxalates, etc.: To 3 Cc. of clear urine, 1 Cc. of peptone solution (3 per cent.), 1-2 Cc. of Lugol's solution and 2 Cc. of ammonia are added. On acidulating with hydrochloric acid a precipitate of fine crystalline needles is formed if acetone is present, the reaction being quite distinct in the presence of 0.01 per cent. of the latter.—Pharm. Ztg., liv (1909). No. 81, 798; from Ztschr. f. inn. Med., 1909.

Urine—Detection of Blood.—A. Lejeune recommends the method first proposed by Meyer (1903) for the detection of blood in urine, which depends on the oxidation of phenolphthalin into phenolphthalein by H_2O_2 in the presence of blood. The reagent is prepared by reducing an alkaline solution of phenolphthalein by means of zinc to phenolphthalin as follows: 2 Gm. phenolphthalein and 20 Gm. KOH are dissolved in 100 Gm. water, 10 Gm. zinc powder added, and the mixture stirred or shaken, until with the aid of a small flame it is completely decolorized. It is then filtered hot.

In the examination of the urine for blood, 2 Cc. of the urine and 1 Cc. of this reagent are shaken together and 4 or 5 drops of H_2O_2 (12 vol. per cent.) are added. In the presence of blood, the mixture quickly acquires a rose to a red color, the intensity depending on the quantity of blood present. It is claimed that by this method the presence of blood in dilution of from 1 : 1000000 to 1 : 100000000 may be determined with certainty, except in the case of urines having a very high specific gravity. In such cases the method is modified by the addition of 3 Cc. of a 2 per cent. alcoholic solution of acetic acid to 3 Cc. of the urine, then adding 1 Cc. of Meyer's reagent and following this with 3 drops of H_2O_2 as in the previous experiment. In either case the intensity of the red color produced remains for a long time undiminished. Pharm. Ztg., (1910) No. 40, 409.

Urine—Presence of Pentose.—Charles H. LaWall calls attention to a urine recently examined by him for clinical purposes, in which he demonstrated by various tests described the presence of pentose, and the subsequent confirmation by its conversion into and isolation of pentozone. The comprehensive examination of the urine showed the following: Sp. gr., 1.028; chlorides (as NaCl), 0.94 per cent.; total sulphates (as SO_4)

0.31 per cent. ; mineral sulphate (as SO_4), 0.30 per cent. ; ethereal sulphate (by difference), 0.01 per cent. ; phosphates (as P_2O_5), 0.30 per cent. ; urea, 3.00 per cent.—*Amer. Journ. Pharmacy*, July, 1909, 329.

Urine—Detection of Levulose.—Reviewing the different methods that have been proposed for the determination of levulose in urine, Dr. A. Jolles, on the basis of careful experiments, recommends the following modification of Ihl-Tchonann's reaction, which is available in urine containing less than 2.5 per cent. of dextrose. The urine is diluted with 10 times the quantity of water, and to 1 Cc. of the diluted urine 8 to 10 drops of 20 per cent. alcoholic solution of diphenylamine and 1 Cc. of concentrated hydrochloric acid are added, and the mixture boiled for 60 seconds. In the absence of levulose, no coloration results ; but if levulose is present in the amount of 0.05 per cent., a distinct blue color is developed within 40 seconds. Urine containing more than 2.5 per cent. and up to 5 per cent. of dextrose, if diluted with 20 times the quantity of water, also fails to produce the color reaction within 60 seconds, but if it contains as much as 0.1 per cent. of levulose the blue color is developed within 40 seconds, as in the previous case.—*Apoth. Ztg.*, xxiv (1909), No. 77, 719 ; from *Rep. of Proc. Germ. Naturalists and Physicians*, at Salzburg, 1909.

Urine—Precaution in Carrying Out Nylander's Test for Sugar.—H. Krauss observes that if the urine contains only small quantities of sugar, Nylander's test may not give a characteristic reaction or may fail altogether. This is due to the simultaneous precipitation of phosphates along with the bismuth precipitate produced on boiling, diabetic urine usually containing an abundance of earth phosphates. The reaction proceeds normally, however, if the urine is first rendered strongly alkaline with NaOH, the precipitate produced is filtered off after a few minutes, the filtrate nearly neutralized with acetic acid, and Nylander's reagent is then applied in the usual way. A perfectly opaque, deep black liquid is produced, from which the finely divided bismuth precipitate settles very slowly, requiring hours for completion.—*Pharm. Ztg.*, liv (1909), No. 81, 799.

Urine—Sugar Determination with Orthonitrophenylpropionic Acid.—Bothe recommends the following as a reliable method for the detection of diabetic sugar if the directions are carefully followed. Using a solution of 3.5 Gm. of orthonitrophenylpropionic acid in 50 Cc. of freshly prepared 10 per cent. solution of NaOH and sufficient distilled water to make 1000 Cc., as reagent, about 8 Cc. of this reagent and 1 Cc. of the urine are mixed in a test tube, and the upper part of the liquid is then carefully heated to boiling. Then, removing the test tube from the flame, a further quantity (about 1 Cc.) of the urine is allowed to flow into the test tube, drop by drop. In the presence of sugar, the mixture assumes a blue color from the top downward, and a greater or less quantity of a blue precipi-

tate, depending on the amount of sugar present, is deposited. In the presence of more than 1 per cent. of sugar, the reaction occurs immediately on applying heat and before the addition of a further quantity of urine.—Pharm. Ztg., liv (1909), No. 81, 799; from Bull de Sc. Pharmacol., 1909, No. 7.

Urine—New Qualitative and Quantitative Method of Estimating Sugar.—The "Journ de Pharm. d'Anvers" describes the following new method for the estimation of sugar in urine: Heat 1 Cc. of the urine, 0.1 Gm. of phenylhydrazine hydrochloride and 0.25–0.3 Gm. sodium acetate to boiling, add 10 Cc. of 3 per cent. solution of NaOH, shake the mixture carefully and set aside. In the presence of sugar the liquid acquires a rose-red to red color, the time varying with the quantity of sugar present and thus making the method available for quantitative estimation. Thus, for example, the presence 1.0 per cent. or more of sugar gives an immediate coloration and 0.5 per cent. in 5 minutes; 0.2 per cent. requires 10 minutes, 0.1 per cent. 20 minutes, 0.05 to 0.02 per cent. 30 minutes for the development of the color. Beyond this time the reaction is no longer characteristic.—Pharm. Ztg., liv (1909), No. 74, 726; from Journ. de Pharm. d'Anvers, 1909, No. 16.

Urine—Detection of Mercury—F. Glaser and A. Isenburg have made a critical examination of different methods proposed for the detection of mercury in urine. They have obtained particularly good results with the Stuckowenkow-Bardach method, which depends on the precipitation of the mercury by means of albumen from the urine, previously faintly acidulated with acetic acid, heating the precipitate with concentrated HCl in the presence of a copper spiral, and determining the presence of mercury by conversion into HgI_2 , in the usual way. Good results were also obtained experimentally by treating the urine with aluminum sulphate and precipitating the alumina by means of ammonia. The alumina carries the mercury quantitatively with it, and this may then be determined by treating the precipitate in the same way as when precipitation is effected with albumen.—Pharm. Ztg., lv (1910), No. 4, 37; from Chem. Ztg., 1909, No. 144.

Urine—Determination of Uric Acid.—Sicuriani recommends the following modification of the Worner-Hopkin method for the estimation of uric acid in urine:—After heating 150 Cc. of the urine, 5 Gm. of ammonium chloride are added, and the mixture is set aside for one-half hour. The precipitate formed is collected on a filter, and washed with 96 per cent. alcohol. To the washed precipitate on the filter 50 Cc. of boiling $\frac{N}{10}$ potassium hydroxide is then added, followed by hot water, and the filtrate obtained is heated until the vapor evolved no longer reacts alkaline with red litmus paper. After cooling, the solution is then titrated with $\frac{N}{10}$ sulphuric acid using phenolphthalein as indicator, and the number of

Cc. of $\frac{N}{10}$ potassium hydroxide V. S. consumed, which, when multiplied by 0.056 gives the amount of uric acid in a liter of the urine.—Pharm. Ztg., liv (1909), No. 55, 538; from Arch. d. Farmacol. sperim. 8, 55.

Urine—Presence of Red Coloring Matter.—L. de Jager finds that if urine is treated with hydrochloric acid and formaldehyde, a precipitate of formaldehyde urea is formed,¹ which is of a yellow to brick-red color due to a red urinary coloring matter. The latter may be separated in form of a carmine-red powder by quickly filtering off the first fraction of precipitate. It is insoluble in water, chloroform, ether, benzol, &c., but dissolved when heated with concentrated hydrochloric acid, being again precipitated on addition of water or alcohol. This coloring matter is possibly identical with the "nephroresin" of Arnold.—Pharm. Ztg., lv (1910), No. 29, 291; from N. Chem. Zentralbl., 1910, No. 10.

Biliary Coloring Matter—Detection.—Emil Abderhalden recommends the following method for detecting biliary coloring matter in body fluids and tissues, as well as biliary calculi, by shaking out the substance in question with chloroform and then adding the chloroform solution to a stratum of Gmelin's reagent (conc. nitric acid containing HNO_2). On careful admixture of the two layers an intense blue-red color is developed, even in presence of very small quantities of biliary pigment.—Pharm. Ztg., liv (1910), No. 29, 294; N. Chem. Zentralbl., 1910, No. 8.

Walrus Bile—Constituents.—In the course of the systematic examination of the bile constituents of Arctic animals, O. Hammarsten has investigated that of the walrus. By fractional precipitation of the gall acids, besides ordinary taurocholic acid, the following acids have been isolated: *a-Phocataurocholic acid*, forming fine needles; the barium salt has the formula $\text{B}_{28}\text{H}_{44}\text{BaNSO}_8$, and the free acid, $\text{C}_{28}\text{H}_{42}\text{NSO}_8 + 2\text{H}_2\text{O}$. When *a-phocataurocholic acid* in 8 per cent. solution of caustic soda is digested for eight hours in a Papin's digester, *a-Phocacholalic acid*, $\text{C}_{27}\text{H}_{37}\text{O}_8$, or $\text{C}_{27}\text{H}_{36}\text{O}_8$, is formed, which solidifies on cooling to a crystalline mass. *β -Phocacholalic acid* was also isolated from another fraction in white needles, sintering at 133°C ., and melting between 152° – 156°C . A third fraction contained *β -phocataurocholic acid*, the barium salt of which, and the free acid, were not obtained crystalline.—Pharm. Journ. and Pharmacist, Jan. 1, 1910, 7; from Ztschr. Physiol. Chem., 61 (1909), 454, through Chem. Zentralbl., 1909, 2, 1262.

MINUTES

OF THE

FIFTY-EIGHTH ANNUAL MEETING.

THE Fifty-Eighth Annual Meeting of the American Pharmaceutical Association was held in the city of Richmond, Virginia, beginning on Tuesday, May 3, 1910, and running through to Saturday, the 7th, inclusive. The headquarters of the Association were at the Hotel Jefferson, on Franklin street, where all the various sessions were held. This was the third time in the history of the Association that it had met at Richmond, the first time being in 1873 and the second in 1900. The members present who had attended one or both of the former meetings were somewhat prepared for the warm-hearted, characteristic hospitality of the capital of the "Old Dominion," but it especially impressed the younger members who were having their first experience of real Southern hospitality. The Governor of Virginia and the Mayor of the city of Richmond, in their welcoming addresses, left no room for doubt as to the sincerity and heartiness of the welcome accorded the Association, and the members present showed every evidence of their appreciation of the generous spirit manifested by their hosts. The meeting was well attended, the increase of membership was encouraging, and the amount of work accomplished was something extraordinary. The number of papers contributed to the various Sections was unusually large, particularly in the Scientific Section, and the interest in the Section meetings was active and sustained. There were several simultaneous meetings of the Sections, and the work of the week was condensed into five days. As was to be expected, the meeting was notable for the discussion of subjects to be brought before the Pharmacopœial Convention to assemble in Washington City the following week, and a great deal of time and thought were given to the principles which should prevail in the forthcoming decennial revision of the Pharmacopœia. The entertainment features, though ample and enjoyable, were not permitted to encroach too much upon the valuable time of the Association, and the Richmond meeting of 1910 will go down in the annals of the Association as one characterized by hard work and zeal for the uplift of pharmacy.

FIRST SESSION—TUESDAY MORNING, MAY 3, 1910.

The first general session was called to order by President Henry H. Rusby, of New York, at 10:15 a. m., in the convention-hall of the Hotel Jefferson, and the convention was opened with prayer by the Rev. George W. McDaniel, of Richmond.

The President commented upon the fact that it was not often in the history of the Association that it enjoyed the privilege of being welcomed by the Governor of a State, but it had that distinction this morning, and the Honorable William Hodges Mann, Governor of the State of Virginia, would extend a welcome to the Association on behalf of the "Old Dominion."

Governor Mann was fully equal to the occasion, and welcomed the Association to Virginia in an address replete with cordiality, with patriotic fire, and interesting and instructive historic reference. He began by declaring the distinct feeling of pleasure he had in standing before such a body of men to deliver an address of welcome, and with true chivalric spirit proceeded, then, to compliment the ladies and congratulate the members upon having their wives and daughters with them in such goodly number. He remarked that the President had made a mistake in introducing him as the Governor of Virginia; that the real governor he had left behind at the executive mansion—that he was only the lieutenant governor! (Laughter.) He said he recalled that, on one occasion, during the canvass, he had said to his wife, "My dear, if I am elected governor, are you going to be lieutenant governor?" She replied, "I am going to govern you all right." (Laughter.)

Continuing, the Governor said:

"Now I want to tell you something about the State that is bidding you welcome, and I want to say just so much about Virginia as applies to you as well as to us, for much of the history of Virginia—the deeds done in the past, the great men that she has produced—is a part of the history of these United States. And I want you to understand that Virginia is a part of the American Union, and that her sons are going to follow the flag of this great country wherever it goes. (Great applause.) I shall not ask you to share with us in our traditions and in our history to any greater extent than I am willing to share with you in your history and in your traditions, and in the splendid record which your great men of the North have made. I want you to understand that we take pride in the great achievements which have been wrought by Abraham Lincoln, and that the great ability and the splendid magnanimity of Ulysses S. Grant are recognized by us.

"As I have said, much of the history of Virginia is the history of this great country. If you will go down to old St. John's church, on Main Street, you will see the place where Patrick Henry uttered the battle-cry

of liberty which went throughout the length and breadth of this great land, and came back in the echoes from Bunker Hill. If you have time to go down the Potomac river, you will see in Westmoreland county the birth-place of the leader of the army of the Colonies, who was a son of this old commonwealth. And then if you will take the time to read something about the early history of Virginia, and note the struggles which were made for civil and religious liberty—a struggle in which you are just as much interested as we are here, and the results of which you are sharing to-day along with us, you will see how Virginia has wrought in making the history of the American people. It is hard for us to understand in the twentieth century that 156 years ago, everybody, except the people who belonged to the Established Church, had to worship with open doors. They could not be trusted. And when I say outside of the Established Church, I want to be understood as casting no reflection upon that church. The people who settled Virginia were not ‘kickers,’ they were adventurers. They were satisfied with the conditions at home; they did not come here to change those conditions. They came to better their fortunes, and when they came to settle on the banks of the James river, they brought with them the institutions and the church of the mother country. In England the Act of Toleration was passed. But that Act of Toleration was not considered with the same liberality in the Colonies that it was in England; and, therefore, all those who did not belong to the Established Church were required to worship in that church, unless they were fortunate enough to get license to hold services of their own at certain times and places. But they could not perform the ceremony of marriage in Virginia—and that is a ceremony we have always thought was the greatest, almost, that the church was able to perform.

“Now I have just introduced this subject to show you that there were great struggles in those days, and that there were men of liberal minds in the days of seventy-six. Twenty days before the Declaration of Independence, George Mason prepared and there was adopted in Virginia a paper known as the Bill of Rights. That Bill of Rights declared the principles of the Declaration of Independence, which gave life and vigor to the Constitution of the United States and the Constitution of this Commonwealth; and was the greatest paper ever written, in my judgment, by an uninspired pen; and a paper which had more effect upon the world at large, upon civilized people wherever they lived, than any paper which has ever been written. (Great applause.)

“Gentlemen, I just want to tell you this one incident: After that paper was prepared, the friends and neighbors of Mr. Mason came to him and said: ‘Mr. Mason, in recognition of the great work you have done for humanity, we want to send you to the Congress of the United States.’ He replied: ‘I don’t want to go to Congress.’ They came back to him again and said: ‘Mr. Mason, we are not satisfied: We want the people

of the world to understand that we are grateful to you, and we want to show our gratitude and appreciation by making you Governor of this Commonwealth.' He declined that position. They returned to him the third time and said: 'We want to make you a Senator of the United States.' He declined that. They came to him again the fourth time and said: 'We want to nominate you for President of this great country.' He declined that honor. They then said: 'Mr. Mason, what do you want?' He said, 'I want liberty for my children and my children's children.' (Great applause.)

"About twenty days after the Bill of Rights was adopted, as I say, the Declaration of Independence—prepared by another Virginian—became the great paper, the great foundation stone of our liberties. And just here it may not be improper to remark that the first written Constitution of a free people was adopted in this old Commonwealth. It blazed the way for every other Constitution that has ever been written. And it had embodied in it the great principles of the Bill of Rights of this Commonwealth.

"Then, when we were a struggling nation, and it was necessary for the Constitution to be so construed as to give power to the government to carry into effect the plans and purposes of the fathers, once more the Colonies came to Virginia—the States came to Virginia—and got John Marshall as the great expounder of the Constitution. And in passing I would like to say that all the cases which John Marshall decided, construing the Constitution, with the single exception of the Income Tax, have never been reversed by the United States Supreme Court from that time until this time.

"Just one other thing: When we were a struggling people, when we were weak and almost helpless in the eyes of the world, a Virginian had the courage to stand up and proclaim the Monroe Doctrine—had the courage to say to the European nations, 'You cannot come on this side of the Atlantic and establish your institutions. America is for Americans!' (Great applause.) We do not realize now how much courage it required to make that declaration, but if we look back at the conditions that existed then we can see that it required a brave man to stand up in the face of the European nations and make it.

"I have stated these things to you, my friends, because the history of this Commonwealth is a history in which you have an interest. You have part and lot in what has been done by the glorious sons of this old Commonwealth. I tell you these things because I want you to understand the State to which you are being welcomed. We have made history here in the old Commonwealth, and we are prepared to show to you not only the history we have made, but, thank God, there are some people left who helped to make it. And we want to say to you again that, not only has the old Commonwealth produced great men in the past, but if the time shall ever come in the history of this country when there shall be need to

call upon its manhood for protection or to maintain its glory, the sons of Virginia will answer to that call." (Great and prolonged applause.)

Continuing, the Governor proceeded to say that he did not mean by all this to omit the ladies ; and, to illustrate his attitude, he told a good story of John Hay, late Secretary of State, to the effect that when as a young man he was one of the *attachés* of our embassy to France, and was called on upon one occasion to make a speech and respond to a toast, "Our Countrywomen," repeatedly, through habit, spoke of them as "My Countrymen," and finally excused himself upon the ground that "the latter always embraced the former, anyhow."

The Governor then went on to say : "Now, it is my pleasant duty to welcome this Association of Pharmacists to old Virginia. Mr. President, I would bring you the keys, but we haven't anything locked. We knew you were coming, and we have just opened everything. Our doors, our city, our hearts and everything are open to you, and you can just come in and take possession. So it is not necessary for me on this occasion to deliver the keys.

"Now I want to say that, from my standpoint,—and I am sure that all thinking men must agree with me,—a body of men such as I am now addressing must be an important factor in the development and welfare and health of this great country. And we have a great country, the greatest that the sun ever shone upon ! (Applause.) Somebody has said that even if the hogs that are annually killed in this country were put together in one great hog he could "dig the Panama Canal in two roots and a half."

The Governor then went on to pay tribute to the great advance made in the practice of medicine in the past twenty years, declaring it to be his belief that medicine led all the other professions. He said he believed that a great deal of the advancement attributed to surgery was due to discoveries in medicine in the way of antiseptics, etc., which enabled the surgeon to do things to-day that he could not do twenty-five years ago. He then continued : "The doctor writes the prescription, based upon his diagnosis of the disease, and it is left to the skilled druggist to compound the remedies to give relief to the sufferer. The doctor writes the prescription ; but suppose the druggist makes a mistake in compounding that prescription, what becomes of you ? Then if the doctor makes a mistake, the skilled druggist detects it and points it out to the physician ; and he won't put up a prescription which will do positive injury to the man for whom it is intended. I say, therefore, that the skilled druggist is a court of last resort, and we owe much to his integrity and efficiency. They say if the doctor makes a mistake he buries it ; but I can truthfully say, in all my lifetime, I have never heard of as many as half a dozen mistakes being made by druggists. I think that is a record of which any profession might be proud.

"Now, the druggists are influential men—they are obliged to be so. They are men trusted in the community. They are obliged to be so, because they have the lives of the people in their custody. They are men of influence with their neighbors and friends. I have very rarely heard of one of them being a candidate for a political office, and as long as I have been Governor of this Commonwealth I have never had one of them apply to me for any position. I take it, therefore, that while they are influential men, intelligent men, worthy men, they are men who do not obtrude themselves upon the community. I will tell you what is a fact: I didn't know what a good set of people the druggists were until I commenced thinking about this address. I don't just believe there are any better people on the face of the earth.

"Now, my friends, I just want to make one statement. Perhaps I ought to have told you in the beginning, but I forgot it. The best part of my speech is always the last, and I have just looked at my watch and I find I have not got time to make it. (Laughter.) So that when you go away from here, if you can think of any good things I have not said, or which would be appropriate, you may know that I had it all ready to say, but just didn't have time to get it out.

"Now I must quit. Here is the Mayor back here, and he is anxious to make you a speech, and it is impossible for him to hold in five minutes longer. So I just want to say in conclusion that the old Commonwealth of Virginia, of which I have the honor to be Governor, extends to you a hearty welcome to her heart and home." (Great and continued applause.)

The President called on Mr. Henry M. Whelpley, of St. Louis, one of the permanent officers of the Association, because of his location in the Central West, and because of his continued attendance for many years at the meetings of this Association, thereby becoming acquainted with members from all parts of the country, to respond to this eloquent, warm-hearted and patriotic address of welcome from the Governor of Virginia.

Mr. Whelpley responded at length. He said, that, having on previous occasions experienced the hospitality of the State of Virginia—a State renowned for its hospitality,—he was prepared to hear the warm words of welcome from the Governor. He declared that nothing that could be said could exaggerate what was meant by hospitality in Virginia. He also felt that it would be difficult to exaggerate the appreciation of that hospitality on the part of the members of this Association. He said that in listening to the eloquent address of the Governor he felt more like sitting in silence and pondering over the instructive information he had given than attempting a response. Referring to the suggestion of the President that he would call upon him to respond as a member of the Association from the Central West, he said that in the Central West they had learned to know and appreciate the citizens of Virginia wherever they had

settled among them. They had always been good citizens, and many of them had been, and were now, among their leading educators. The experience of the Central West in this behalf he declared to be but an echo of what is found as to Virginians throughout the entire United States.

Continuing, Mr. Whelpley said that the American Pharmaceutical Association had discovered the rare hospitality of the State of Virginia as far back as the year 1872, when it was decided to meet at Richmond in the following year, at which meeting in 1873 the late Albert E. Ebert, who was the first to establish an endowment fund for the Association, presided as President. He then briefly traced the history of this fund, starting at the sum of \$500, and doubling itself since that time by accretions of interest. Starting with this small nucleus, the total invested funds of the Association had now grown to something like \$30,000, the interest upon which sum only could be used. Mr. Whelpley referred to the election of Mr. John F. Hancock, of Baltimore, as President at this meeting, and paid high tribute to his character as a man, and characterized his annual address at the succeeding meeting as one of the ablest papers of its class that had ever been delivered before the Association. Mr. Whelpley went on to say that the Association was so impressed with Virginia and the city of Richmond, that along about the year 1898 it began to think of making a return visit, upon the hearty invitation extended by Mr. T. Ashby Miller and his associates, whose "On to Richmond" cry was too potent to be resisted. So the Association met again in Richmond in 1900, and the presiding officer that year was the late Albert B. Prescott, of Ann Arbor, Michigan, whose name would ever stand out in the history of the Association as that of a man distinguished for his scientific attainments and for his long life of usefulness in the cause of pharmacy. At that meeting of 1900, Mr. John F. Patton, of York, Pennsylvania, was elected President for the ensuing year; and who, like Mr. Hancock, of Baltimore, was present at this meeting—returning again to the historic city of Richmond.

Continuing, Mr. Whelpley assured the Governor that the American Pharmaceutical Association appreciated the privilege of being once more in the capital of the "Old Dominion." He said this Association was the broadest organization of pharmacists in the world. No other organization included every class connected with or interested in pharmacy—the retailer, the wholesaler, the manufacturer, the physician, the editor, the chemist, the clerk—every individual interested in pharmacy being eligible to membership in it. He said the Association had come to Richmond for work, and that it was not an organization of speech-makers. It was in no way akin to the young lawyer who thought in multiplicity of words there was strength, and when he had put the judge and jury to sleep, apologized to the court for trespassing upon its time, eliciting the retort, that "to trespass upon time was one thing, to encroach upon eternity was quite

another." He concluded by saying that the members could easily encroach upon eternity in expressing their appreciation of the good things set before them, but they would desist and make use of their opportunities for enjoyment.

The President stated that the Association was doubly fortunate this morning, in that it not only had the Governor of the State to welcome the members, but that his Honor D. C. Richardson, Mayor of the City of Richmond, was also present, and would extend a welcome on behalf of the municipality which he represented.

Mayor Richardson came forward amid the applause of the members, and delivered an eloquent address. He started out by saying that after the able and witty speech of his Excellency the Governor, and the response made thereto, he felt that his duties and privileges were somewhat curtailed. He said that as he sat and listened to the speech of the Governor, abounding as it did in wisdom and wit, and noted the laughter evoked by his witticisms, he could not but ask himself the question, "Is it really true that the Chief Executive of Virginia, who is thus addressing this audience, is the *dry* Governor that he is said to be?" He was constrained to believe this was a mere newspaper slander. He was forcibly reminded of the advice given to a young but overtrusting barrister by an old and very practical justice of the peace, before whom he had made a somewhat startling statement, and who, when called upon for his authority, said he got it out of the newspapers, that it was a safe plan for a man "to believe only half that he saw, but very little that he heard, and not a darned thing that he has seen in the newspapers." The Mayor then proceeded to throw some "bouquets" at the pharmacists of the country, whom he declared he had known for forty years "as the best people on the face of the earth." He also proceeded to compliment the ladies, denying that they were along to watch their husbands, as the Governor had facetiously intimated in his remarks, and declared that the pharmacists had gladly brought their wives because they wanted to show the people of Richmond the beautiful and accomplished women they had for their life companions. The Mayor then proceeded, in the warmest terms, to welcome the Association to the city of Richmond, a city which he declared had no keys and no need of keys, for it had neither locks nor walls for this Association, but everything was wide open—except on Sunday. The Mayor then waxed eloquent as he proceeded to dwell upon the history of Virginia and the city of Richmond.

"We welcome you to our city—to this historic city of ours; the oldest with one exception,—and I can hardly make that an exception,—the oldest settlement on the American Continent. There was a temporary settlement at Jamestown, but in the result it can hardly be called by that name. On the 24th day of May, 1607, eleven years before the landing of

the Pilgrims at Plymouth Rock, a band of adventurers who had sailed across the unknown seas sailed up our beautiful river, and here, within half a mile of where we stand, upon an island in the river, planted the Cross, the symbol of Christianity, and in the name of their sovereign, King James I of England, then and there took possession of the country and established a settlement here at Richmond—a settlement which, with but slight interruption, has existed until the present day; the little town, in due time, giving place to the city which succeeded it. This settlement passed through as many vicissitudes as any settlement, town or city on the American Continent. Here within the sound of my voice, almost, rang out the war-whoop of the Indians in deadly contest with the settlers, and the little stream on the western border of our city ran red with the blood of the savage and the British, and still bears the name of 'Bloody Run', in memory of that sanguinary conflict. It was here during the Revolutionary War that the tocsin of war was sounded in a building which still stands, and in which the worshipers gather each Sunday to send up their prayers of thanksgiving to Almighty God. It was here that many of the distinguished men of the Colonies in early days lived and worked and endured. It was here in this city—and the building is still standing—in which that great chief justice, John Marshall, for more than thirty-five years, lived and labored and loved; and while he did not die yesterday, in one of our cemeteries, beside those of his beloved wife, his ashes now repose. It was around our city that contending armies fought and bled. It was here that a mighty effort was made to disrupt this Union. It was here that devoted men, equally earnest in their ideas of right, opposed determined front, those without seeking to capture the city, those within opposing with all their might the beleaguering host. It was here that devoted women went through our streets and into our homes and hospitals, ministering to the suffering and dying. It was this devoted city that suffered frightful disorder and destruction by fire and sword, and all the horrors of war. But, my friends, I want to say that Richmond, although she was crushed down and destroyed, has arisen from her ashes, and has taken her place again among the cities of this great Union. She has turned her face to the east, and is keeping step with the great onward march of Progress. (Great applause). And, my friends, we who live here,—we who endured the trials and privations and dangers of those days,—while we cherish with affection all the reminiscences of the past, have buried all the hate and animosities of those days, and the flag of this Union is our flag, and this country is our country; and if the foreign foe menaces us, the men of Virginia and the men of Richmond will march side by side with the men of any other State or city in the Union, to uphold the glory of our country and the honor of our flag. (Great applause).

We welcome you to Richmond, ladies and gentlemen. I know that these words of mine are superfluous, for already men who are members of

this Association, and who reside here, have given you the warm grasp of fellowship, and you have seen in their bright faces that welcome of which that warm grasp and that pleasant smile are the assurance. Ladies and gentlemen, I thank you." (Great applause.)

The President called on Mr. James H. Beal, of Scio, Ohio, to respond to the address of welcome delivered by the Mayor.

Mr. Beal discharged this duty handsomely, and assured the Mayor of the sincere appreciation of the members of his warm words of welcome. He said the members would bear with them for many a day after leaving the precincts of the municipality of Richmond, and the borders of the "Old Dominion," a happy recollection of the sentiment that had been so eloquently voiced. Continuing, he said in part: "We not only concede to the 'Old Dominion' a glorious history and a heritage of many great men, but we claim and demand it as our right to participate in these glorious recollections, as a part of the heritage of the American nation. We teach it in our schools, and the first name of American citizenship which our children are taught to list and to love with veneration is that of a great Virginian. You realize, and we realize, that there is scarcely a great principle of American jurisprudence to-day that did not originate or receive a strong vitalizing impulse from the citizenship of Virginia. We recognize that, and we pay our grateful homage to the "Old Dominion"—a name which we utter with love and respect, as we think of what we have received from this grand Commonwealth."

Mr. Beal referred to the former meetings of the Association at Richmond, and said that each time the Association had borne away with it an appreciation of the hospitality and the excellence and the worth of the citizenship of the city and State, and the part which they had played in American civilization. He thanked the Mayor very heartily for his welcome, and assured him that the acceptance of the members would fully measure up to the warmth of his greeting. (Applause.)

By invitation of the Chair, Mr. E. H. Ladish, of Chicago, as the accredited representative of the National Association of Retail Druggists, next addressed the Association in words of greeting from that body. Not being accustomed to make extemporaneous remarks, Mr. Ladish had reduced what he had to say to writing, and he spoke as follows:

"Our delegation have the pleasure of bringing the warmth and interest of the N. A. R. D. We wish you continued success and trust your convention will yield the usual good crop. Your fifty-seven years of usefulness stand out very prominent in matters of pharmaceutical import, your accomplishments have been many, and we are very proud of the daddy of the pharmaceutical associations of America. We are looking forward with interest to the issuance of the new edition of the National Formulary, and I want to pledge our association to again help you to place this little

grant if possible in every drug store in the United States. Mr. President, I have the distinguished honor of wishing your Association a long and useful career, and now with a Godspeed I must say Auf Wiedersehn."

Also, by invitation of the Chair, the Association was addressed by Mr. Edgar D. Taylor, of Richmond, as the accredited representative of the National Wholesale Druggists Association. Mr. Taylor said the National Wholesale Association extended their heartiest greetings, and hoped that the meeting would result in great good to this noble Association. He said if he mistook not, his association was next in years to this. He welcomed the Association to Richmond again, and said that not-only the National Wholesale Druggists Association, but that every druggist and jobber and retailer in Richmond wished for the Association an indefinite stay. (Applause.)

The President next called on Mr. M. I. Wilbert, of Washington City, to address the Association on behalf of the Public Health and Marine Hospital Service. Mr. Wilbert extended the felicitations of Surgeon General Wyman, of the Public Health Service, and assured the Association that General Wyman had repeatedly expressed his appreciation of the public-health work that this great Association was doing, and thoroughly appreciated its efforts in that direction. Mr. Wilbert said that the pharmacists of the country were not, as a rule, aware of the great extent and importance of the work being carried on by that department of the Public Service; and he wanted to ask the privilege of presenting to the Secretary a short outline of the work that was being done, so that the members might, at their leisure, study over the possibilities of their work, and the possibilities of coöperation with the Public Health Service, and learn something of the meaning of its present-day activities. He said that the assertion had often been made that the Public Health Service did not extend to pharmacy the recognition that was its due. This assertion, he said, was unfounded, and would be proven to be so to the satisfaction of those who would take the time to thoroughly study the work that was being done by that bureau. He spoke of the scientific research work that was being done and carried on as a division of the work of Public Health and Marine Hospital Service, and the several branches into which the scientific work was divided. One of these was the Division of Bacteriology and Pathology, which is devoted to work along pharmacy lines. That division had the care of the standardization of serums. In his judgment, no more important product or medicine is used in this country than serums. Then the Division of Chemistry was also doing work along pharmaceutical lines. The Division of Biology, which had done so much to call attention to the diseases peculiar to the Southern States, was doing work of interest to pharmacists, and he thought the pharmacists of this country should get in touch with work being done under the auspices of this division and the

Rockefeller Foundation in connection with the work on hook-worm. He advised the southern pharmacists, especially, to procure a copy of a late bulletin on soil pollution. Also, that the members generally should secure a list of the publications of this Public Health Service, and send for such publications as appealed to them, and thereby learn how much of really valuable work the Service was doing at the present time, and how much more it could do if the pharmacists of the country would take an interest in that work and coöperate with it. (Applause.)

PHARMACY AND THE U. S. PUBLIC HEALTH AND MARINE HOSPITAL SERVICE.*

Despite the fact that for upwards of a decade representatives of the Public Health and Marine Hospital Service have regularly attended the meetings of the American Pharmaceutical Association there appears to exist, even among pharmacists, a lack of appreciation of the varied and far-reaching efforts to protect the health of the American people that are now being made through the several divisions of the Service.

The Public Health and Marine Hospital Service, as now organized, is a bureau of the U. S. Treasury Department, and had its origin as the "Marine Hospital Service" in 1798. This Service was reorganized in 1870 and in 1902; its duties were materially augmented and its name changed to "Public Health and Marine Hospital Service." The varied activities of the Service are in a measure reflected by the titles of the administrative divisions, which include: Marine hospitals and relief, domestic quarantine, foreign and insular quarantine, sanitary reports and statistics and scientific research.

More detailed information regarding the activities of these several divisions is obtained from the Service publications, which are classified under five heads: 1. Annual Reports, 2. Weekly Public Health Reports, 3. Public Health Pamphlets and Brochures, 4. Bulletins of the Yellow Fever Institute, and 5. Bulletins of the Hygienic Laboratory.

The importance of the work done in connection with quarantine service at domestic ports is evidenced by the fact that during the fiscal year ending June 30, 1909, no less than 8,266 vessels were inspected and 520 were disinfected as a precaution against yellow fever or plague. Foreign quarantine work includes investigations into the sanitary history of vessels destined for ports in the United States, the inspection of vessels' crews and passengers and the fumigation or disinfection of ships when necessary.

The Division of Sanitary Reports and Statistics of the Public Health and Marine Hospital Service collects information regarding the existence and prevalence of quarantinable diseases, and the nature and effect of sanitary measures adopted by other countries.

* This essay, submitted by Mr. M. I. Wilbert, is inserted here as germane to the remarks previously made by the author. (*The General Secretary.*)

Much of the scientific research done in connection with the Public Health and Marine Hospital Service is carried on in the hygienic laboratory. The original building of this laboratory, located at 25th and E Sts. N. W., Washington, D. C., was occupied in 1903, and the more recent extension was completed in 1909. It is a brick and sandstone structure, 230 feet long, two stories in height, with a basement and attic, and contains 41 rooms.

The personnel of the Hygienic Laboratory, at the close of the last fiscal year, comprised a total of 55 persons: A director, an assistant director, 3 chiefs of divisions, 8 commissioned medical officers, 2 pharmacists, 11 technical assistants, an artist, and 28 attendants. To facilitate the pursuance of the scientific work, the laboratory is divided into divisions more or less distinct and independent of each other. These divisions include:

1. Division of Pathology and Bacteriology.
2. Division of Zoology.
3. Division of Pharmacology, and
4. Division of Chemistry.

The work that has been done in connection with the several divisions of the Hygienic Laboratory has attracted widespread attention, and is generally recognized as being of great scientific value.

As a practical illustration of the appreciation of this work by individual citizens, it is but necessary to call attention to the recent gift of \$1,000,000 by Mr. John D. Rockefeller, for the purpose of eradicating hookworm disease from the Southern States. This gift is not alone a recognition of the scientific character of the work done in the Hygienic Laboratory, but is also a tribute to the ability and worth of the chief of the Division of Zoology, who was the first to call attention to the now recognized prevalence of hookworm disease in the Southern States.

In addition to hookworm disease the Public Health and Marine Hospital Service largely in, or under the auspices of the Hygienic Laboratory, has carried on extensive investigations on the causative factors and the possible prevention of tuberculosis, yellow fever, plague, leprosy, typhoid fever, pellagra, diphtheria, tetanus, rabies, and other infectious and contagious diseases.

The Hygienic Laboratory is by law entrusted with the supervision of the manufacture and sale of sera, vaccines and similar products, and the Division of Bacteriology has evolved and perfected standards for anti-diphtheritic serum and for antitetanic serum that have been accepted without question by the manufacturers of these products, and have been favorably commented upon and endorsed by bacteriologists and scientists generally.

The Public Health and Marine-Hospital Service has been repeatedly accused of not giving to pharmacy the recognition that it rightfully de-

serves in public health work. That this accusation is unfounded and is, in fact, based on a misconception of what pharmacy itself is, or should be, is evidenced by the work in connection with the Division of Pharmacology of the Hygienic Laboratory.

Even at the present time this division is exceeded in size and importance only by the Division of Bacteriology and Pathology, and the scientific work that has been done under the direction of its chief, Dr. Reid Hunt, is widely recognized as being of great scientific value. This work is particularly interesting in that it is of prophetic import; being representative of the future of pharmacy and indicative of the work that can be, and very properly should be, done, by the professional pharmacist if he is to continue as the accepted authority on information relating to drugs and medicines.

Much of the work that has been done up to the present time relates more or less directly to the materials included in the Pharmacopœia of the United States.

One of the earlier bulletins emanating from the Division of Pharmacology, included a discussion of the changes in the U. S. P. VIII, particularly the nature and properties of the new remedies that were included in that book.

More recent bulletins deal largely with compilations of comments on the Pharmacopœia of the United States and the National Formulary. These compilations are being prepared at the request of the Board of Trustees, and, it is expected, will be of material assistance in the forthcoming revision of the U. S. P.

While much routine work is done in connection with the examination of chemicals and pharmaceutical supplies, the possibility of making original investigations is not lost sight of and the hours devoted to such investigations are by no means limited to the working hours prescribed by the Government regulations.

The publications emanating from the Division include communications on the study of the various suprarenal preparations, the standardization of preparations of the thyroid gland, the toxicity of acetanilid mixtures, the variability and methods of standardization of preparations of digitalis, the solubility of pharmacopœial compounds, the melting points of chemical substances and the reduction of the U. S. P. analytical methods to the purity rubric.

Even this meagre record should suffice to convince the most skeptical that in at least one of the Government Medical Services, Pharmacy, "Pharmacia Vera" has received proper recognition and that the work now being done in the Division of Pharmacology of the Public Health and Marine Hospital Service is destined to open up for true pharmacy a field of activity that is as yet but imperfectly occupied.

The President said he thought the Association should value very highly

these remarks of Mr. Wilbert, as it was a practical, valuable communication to pharmacists. He thought it was not possible for the people of this country to know too much about the work that was being done at Washington by the different departments. He also reminded the members that it was absolutely impossible for the federal government to make headway in its work along pharmaceutical lines without their co-operation and assistance. He then called on Mr. Lyman F. Kebler, of Washington, to present a synopsis of the work being done along these lines by the Department of Agriculture.

Mr. Kebler began by saying he regretted to have to state that Dr. Wiley, the chief chemist of the Department of Agriculture, could not be present, but it would give him pleasure to explain the nature of the work being done by the Department. He said that the Bureau of Chemistry in that Department looked to this Association for support and sustenance in many ways. For instance, in the Bureau of Chemistry they have a Division of Foods, which looks to the food questions of the country. There is a Division which looks after such things as mineral waters. Then there is a Division of Drugs, which is placed in the hands of one wholesaler and one retailer, who are charged with the ascertainment of the genuineness of the product. The Department has laboratories in all of the large cities of the country—New York, San Francisco, Seattle, Portland, Galveston, Cincinnati, Philadelphia, Baltimore, Chicago, Detroit, Savannah, etc. These laboratories are watching the character of goods that are brought into this country and examining the articles that are sent from the adjacent countries in which they are located. Mr. Kebler said he hoped that those who proposed to attend the Pharmacopœial Convention at Washington next week would make it a part of their pleasure and duty to go to the Department of Agriculture and inspect for themselves some of the work they were doing, the actual results being accomplished, by inspecting some of the reports of the results obtained there.

Mr. Murray Galt Motter, of Washington City, was next called upon to convey the greetings of the American Medical Association to this body, and he did so at some length, saying that at a meeting of the Section on Pharmacology and Therapeutics of the American Medical Association, held in Atlantic City in 1909, the chairman of the delegation from the American Pharmaceutical Association requested that the Section on Pharmacology and Therapeutics appoint a committee to coöperate in the revision of the National Formulary, and that in compliance with that request the Chairman appointed a committee consisting of Doctors Robert A. Hatcher, Torald Sollman, Lyman F. Kebler and Reid Hunt. The Chairman of that Committee had signified his intention of being present at this meeting to make report for the Committee. It must be obvious to all that the work that had been done in the last four years, and notably in the last two years, towards increasing a knowledge of the United States Pharma-

copoeia among the medical profession had been very great. He referred the members to the significant reports made at the last meeting of the American Medical Association on the part of the Sub-Committees and Sub-Sections. The Section on Practice, the Section on Obstetrics, the Section on Ophthalmology and the Section on Pharmacology and Therapeutics had given much attention to this subject. This work was undertaken at the suggestion of, and in many ways by the direction of, the Chairman of the Committee on Pharmacology. All these reports were evidence of a growing community of interest between the two professions. Never before, perhaps, have the times and conditions been so opportune for efficient, practical coöperation between the medical and pharmaceutical professions.

This ended the oral addresses of welcome and greeting, and the General Secretary was given opportunity to read a telegram of cordial greeting and good wishes from the Los Angeles Retail Druggists' Association, as follows :

LOS ANGELES, CALIF., May 2, 1910.

Dr. H. H. Rusby, Pres. A. Ph. A., Care Hotel Jefferson, Richmond, Va.:

Los Angeles Retail Druggists' Association sends its greetings, and wishes each member health, happiness and good cheer. May God crown and prosper your good work.

W. R. DICKINSON, *Pres.*

On the motion of Mr. Philip Asher, of New Orleans, it was understood that the General Secretary would make an appropriate response to this telegram.

The General Secretary next read a communication from the Women's Auxiliary of the National Retail Druggists' Association, as follows :

April 29th, 1910.

The American Pharmaceutical Association, Richmond, Virginia.

DR. H. H. RUSBY, *President.*

Dear Sir: The Woman's Organization of the National Association of Retail Druggists sends you hearty greetings, and best wishes for a most successful meeting upon this your fifty-eighth gathering. For over a half a century your organization has stood for the highest ideals in American pharmacy and has rendered services which have been of lasting benefit to our calling: we congratulate you. We hope that the future will bring you still greater honors; we hope that the future will bring honors also, to all the pharmaceutical organizations of this country, and that all may co-ordinate their efforts, and make their work for the uplift of American pharmacy and the betterment of the conditions of pharmaceutical practice, more effective; and in this work we wish to assist, not as pharmacists, but in our own sphere, as members of a woman's pharmaceutical organization.

Sincerely and fraternally yours,

NELLIE FLORENCE LEE, *President.*

ESTALLENE A. FORBRICH, *Secretary.*

EMILY M. MORRISON, *Chairman of Fraternal Relations.*

The President stated that, as far as he recalled, this was the first time

the Association had ever had greetings of this kind from the members of the Women's Association. He called for action upon the communication.

On motion of Mr. Thomas P. Cook, of New York, the letter was received, and the Secretary was directed to send an appropriate response thereto.

The Chair here gave opportunity to Mr. T. Ashby Miller, Local Secretary, to make a statement, and Mr. Miller proceeded at length to outline the various features of entertainment provided by the Local Committee for the visiting members and their ladies during the week of the Convention. This program, he said, was in print, but the members had not seen it as yet. The Chair stated that, at the proper time, he had no doubt the Association would formally express its appreciation of the work done by the Local Committee, but he wanted to take this opportunity to express his own personal appreciation and gratification at the program of entertainment that had been mapped out for the members. He said he thought it was due to the Secretary, Mr. Miller, and his committee of ladies and gentlemen, to make preliminary acknowledgment of the program which had been provided for the entertainment of the members of the Association.

The President announced that the time had now arrived for the reading of the President's Annual Address, and he would ask that Mr. C. B. Lowe, of Philadelphia, First Vice-President, take the chair, while he read this paper. He thought it was proper to preface the reading by a brief statement: The American Pharmaceutical Association ought to number in its membership a majority of the pharmacists of America. But the great majority of pharmacists will not join the Association, unless they have some good reason for doing so. It cannot be expected that they will seek out the Association and ask to connect themselves with it, unless the Association itself can show them it is going to do them some good. That is human nature. The general thought that had been in his mind, therefore, throughout the preparation of his address, had been the vital question of membership, and coupled with that the query: What can we do to make it worth while to the many thousands of pharmacists in America to become members of the American Pharmaceutical Association? This, he said, had been the thought which had been uppermost in his mind during the whole time he had given to the preparation of his address, and it was a subject to which he asked the earnest attention of the members this morning.

Vice-President Lowe took the chair, and President Rusby proceeded to read his address as follows, interspersed with numerous explanatory and amplifying remarks:

PRESIDENT'S ADDRESS.

Fellow Members : It has seemed to me that nothing could be more fitting on the present occasion than a plain, practical discussion of the work of the Association, and the best methods of its performance. Two reasons, among others, have especially influenced me in this decision. The fact that the recommendations made last year by President Oldberg for rather sweeping changes in our working organization are this year to be presented by the Council for your consideration will impart an unusual value to a discussion of this subject. I have, moreover, long been impressed, and more strongly so since my election as President has called me to a more careful study of the Association's history and welfare, with the feeling that we are relatively failing in the accomplishment of our mission. Lest this statement may be construed as indicating a want of appreciation of what we have done, I desire to express the high satisfaction with which I have scanned our Proceedings of previous years. These volumes are replete with useful scientific information, much of it originally contributed by our own members, and with sound views on professional subjects. It remains true, however, that we have failed to gather in much, if any more than five per cent. of the eligibles in this country, and that the principles which we espouse rule but the majority of our profession. In countries where such societies are official, and where membership exists by virtue of the profession, numbers mean nothing; but where, as here, membership and activity are voluntary, the extent of membership does have much force in determining conditions. Briefly stated, it is the mission of this Association to establish the practice of pharmacy in this country upon the ethical and professional basis that we approve, and to do so in a way not inconsistent with business success. But two ways are open for accomplishing this object, namely, the increase in our membership and the extension of our influence among non-members. It is with this in view that I speak of a relative failure in the accomplishment of our mission.

It is in no Utopian sense that I remind you that our Association and the profession that it represents are but means to an end, and that end, ultimately, an unselfish one. That our Association, profession and individual business exist for the welfare of those whom we serve is asserted in the statement of our objects, set forth in the constitution to which we have all subscribed. Attention to this truth should therefore be the consideration that determines the handling of every question that arises regarding the policy and proceedings of the Association. Your speaker can conceive of no other basis of consideration of the problems which to-day confront us, and his official advice and recommendation on the present occasion are determined wholly in the light of professional duty, and of experience as determining the most successful method of its performance.

It is thus the object of the A. Ph. A. to advance the profession of pharmacy in such ways as shall most fully and perfectly fit it for benefiting its dependents and patrons, and to strengthen its own organization so as to increase its means for performing this service.

My distinguished predecessor in this office stated some unwelcome truths regarding conditions in American pharmacy. It was their unwelcomeness, and not a want of accuracy of statement, which chiefly excited hostility. Now, eight months after their promulgation, they are looked upon in a far more kindly spirit than that in which they were originally received. The extent of this difference is one measure of the year's advance of this Association. Flattery is sweet, but faithful are the wounds of a true friend. Little advance is to be made through the repetition of already accepted truths. Real progress is accomplished by those who struggle for the recognition and acceptance of the worthy new.

I shall not here dwell upon the errors and shortcomings of pharmacy. They have

been set before you over and over again, from many sources and in many ways. But few of us will recognize and realize them all. Most of us will do so with regard to most of them, and none will fail to do so as to all of them. Set your thoughts upon any one of them that you may select, and answer whether the constitution of this Association is not directed straight toward its correction. You cannot answer "nay." Survey the field of retail pharmacy, in the light of what it should be, judged by your individual pattern, and we shall all be united in our desire and effort to improve it, whatever may be the particular line of work that appeals to our respective individual idea.

How the Association can best accomplish these results is the problem which has specially occupied my attention during the past year, and it is the resulting views which are now submitted for your consideration. Of necessity, these considerations apply to the professional side of our work. Quite as necessarily they apply to the material side, not because the two are at all coördinate in rank, or worthy to be compared in their ultimate importance, but because our material prosperity contributes the only possible basis for the performance of our professional duties.

It may be here remarked that as my ideas concerning the functions of our more important committees, and the necessities for their administration crystallized, I deemed it proper to communicate them to the respective chairmen. In some instances, these chairmen have seen fit to apply my ideas in the work of the present year, and from them you will doubtless hear expressions of approval, or the reverse. The most careful study that it has been possible for me to make of the conditions in and the relations of our Association has convinced me that the key to our success lies in the extension of our membership. This conclusion rests upon two facts. First, the need of funds for carrying on our work; second, the influence of membership upon the members and upon the communities in which they live and which they ought to represent in the Association.

Although the Association has some other sources of income, the principal and almost the only source to which it can look as a certain permanency, is its membership dues. The Treasurer is authority for the statement that these dues alone would be insufficient to support its present activities, yet it is true that the success of these activities is even now curtailed by the want of funds. Those of us who have kept in close touch with the Association's activities through a series of years can recall not a few propositions for the performance of good and important work which have been rejected because we had not the money requisite for their execution.

That the good influence of membership in the Association is immeasurable can be seen by observing its effects, either upon the individual members or upon the community. It is impossible for any man to come within the sphere of influence of our annual meetings, or of our publications, without becoming thereby a worthier member of the guild; and no one can travel over this land, observing and contrasting the conditions of pharmacy in the sections which are and are not well represented in our membership, without seeing that the former are, other things being equal, of a higher type, regarded from almost any point of view.

These and similar considerations have convinced me that the important field of operations, around which all others should cluster, is that of increasing our membership, the most efficient and beneficial methods of doing which is therefore my principal topic. The highest member is the one who has as his object no personal advantage other than that of gratifying a desire to aid in the Association's work. Such people require no inducement, but their number is not great, so we must make it our business to provide all the inducements possible to secure members.

To shift this responsibility upon a membership committee is little short of fatuous. That committee can do very little unless its efforts are supplemented, or rather preceded, by numerous other influences in creating which all must unite. Our membership committee may be compared with an agent who books the orders for which the advertising

department has made wise preparations; with the president who awards diplomas to those who have been qualified to receive them; with the minister who baptizes the sinners who have been converted by the Salvation Army.

Probably the two most important attractions which we can offer are those of attendance at our annual meetings, and our publication of interesting and valuable information, regarding each of which I venture a few suggestions.

As to the former, it may be said that a small percentage of attendance at our annual meetings must be always looked for. It is doubtful if many members would absent themselves if they could—or felt that they could be present; this is certainly true of those who have ever attended the meetings; but conditions of time and expense must ever be expected to prevent a large majority from being present.

In just so far as we can remove these adverse conditions we can increase our attendance, so that even the humble question of transportation and hotel rates becomes well worthy of a place in the presidential address. I believe that on various occasions a more insistent course on the part of the committee of arrangements might have succeeded in securing better rates from the hotels that we have patronized. In other cases, accommodations equally as good in their essential features might have been secured by the selection of less expensive headquarters. It is always possible for those who desire it to stay at a more expensive hotel than that selected for the headquarters, but it is not so easy or agreeable to leave the headquarters' hotel for one that is less expensive.

It is especially desirable that there should be an increased attendance by the members of our families; and several possibilities for bringing this about suggest themselves. Perhaps the most important is that the headquarters' hotel should be induced to make a really liberal concession to additional members of a family occupying the same room. It does not admit of dispute that the additional expense of the occupation of a room by an additional person is quite trifling, and that a good hotel management should be ready to make concessions for securing an additional guest in this way, a concession which is of considerable importance to our members and to our meetings. It has, however, become a very common practice for hotel clerks to refuse such terms unless insisted upon. It would be well for future committees of arrangements to make a special feature of securing such rates and to insist upon them as one of the conditions of the contract. Such an arrangement would certainly tend to increase the attendance of our families, especially of those living near the meeting place, with great consequent advantages to the social features of our meetings.

It is not impossible, moreover, that some similar concession might be secured in transportation rates. May not the railroads be induced to offer a material reduction in rates to the wives and children of attending members? It would seem that the advantages to the roads of such increased attendance would amply justify such action, and it should not be difficult to devise a satisfactory plan by which the Association would become responsible for any abuse of the privilege by its members. It seems worth the while of our Committee on Transportation to endeavor to work out some such an arrangement with the railroad companies next year. Very likely this would require some general ruling by the federal commission, but this would only add to the value of the result.

This inherent difficulty regarding attendance at meetings has been most wisely met by the provision of local branches, at the meetings of which may be considered not only local subjects, but those relating to the general affairs of the Association. To encourage and support these branches, the Association should go to the limit of its possibilities. Undoubtedly the branches should ultimately become more than self-sustaining, and they should engage in a competition as to which can be most useful to the parent body; yet it seems certain that branches which would ultimately become important may be

unable to establish themselves except through the aid of the Association, and provisions for rendering such aid should be considered in advance. No other agency should be so effective in securing new members as that of the local branches. The committee having that subject in charge should select those localities where branches ought to be established, without regard to their present Association membership, and suiting the method to the present respective conditions, institute a sustained line of effort that will not cease until the object is attained.

For the supplying of interesting and valuable information to our members, we have two agencies, the annual volume of Proceedings and the "Bulletin." Each performs a function, and an important one, that is impossible for the other; wherefore, I am not prepared to endorse the view of my predecessor, that one should replace the other. The history of success in all similar organizations is that they add one publication to another, but never abandon any. In my opinion, the "Bulletin" should be so conducted as to make it largely self-supporting through its outside subscription list. As its value increases and its subscription price is correspondingly raised, it would tend more and more to convert its subscribers into members. I recognize the danger of converting it into a competitor of the regular pharmaceutical journals, which are justly entitled to their subscription field without interference from us; yet it is clear to me that we could accomplish our object while rigidly restricting the "Bulletin" field to that of an Association organ, and thus reduce such objectionable competition to an insignificant minimum. In any case, we should allow no other consideration to restrain us from pursuing that policy toward the "Bulletin" which will make it most effective in building up our membership.

I therefore recommend that the most liberal policy that our circumstances permit be pursued toward the Bulletin, because (1) such a policy will ultimately yield a profit, from the Bulletin account alone; (2) there will result a bonus in the way of membership, which will tend toward a geometric increase.

This discussion should be supplemented by reference to the important relations between the Bulletin and the local branches. Every local branch should feel that it has a claim upon Bulletin space for everything of value that it can offer. Our editors, should, at the same time, be rigid in excluding anything that is not of sufficient value to reflect credit upon the Association. Let us never degenerate into a mutual admiration society, or seek support through the medium of flattery. It is quite possible, without yielding to such a tendency, to make our Bulletin a most powerful magnet for attracting membership to the branches, and thence to the parent body.

It is believed that the work of some of our committees, especially those on the Establishment of Local Branches, on Drug Reform, on Publicity and on National and State Legislation, should be organized on a more systematic basis, and conducted by more sustained methods. Very few of the subjects sought by these committees are likely to be accomplished in a single year. They mostly require persistent and long-continued effort, based on thorough investigation. The work of each year should be performed with a view to its continuation by the committee's successors, and these successors should thoroughly familiarize themselves with the plans under way and with the work that has already been performed. To facilitate this process, the committee should inaugurate a more systematic and formal method of performing their work, preserving a secretary's or chairman's minute-book, with the discussions and motions duly recorded in form for future consultation. Each retiring member should turn over to his successor all his copies of the preceding documents.

The obligations of the Committee on Local Branches have already been referred to. Those of the Committee on Drug Reform have been carefully studied, and the results submitted to its chairman. If this committee is to accomplish anything useful, it must have complete detailed information concerning existing evils relating to drugs and their

abuse. It must know what steps are necessary to correct them and to what extent such means are now being employed and how they should be supplemented. Here its results are taken up by the Committee on State and National Legislation, which should have on file all existing pharmacy statutes and all changes in them. It should have such general instructions from the Association as would enable it to act in influencing legislation, in at least many cases, without waiting for specific instructions. It should adopt some model law, and then endeavor to bring about as much uniformity as possible in national and state statutes, in line with this model. It is obvious that to accomplish such results its organization must be greatly changed. It should have sub-committees in every state for carrying on local work, and the members of these sub-committees should be those who are active in their respective state associations, so as to insure co operation so far as may be possible, between these associations and ourselves. Provisions should be made for meeting such expenses of this committee as are inevitable in the performance of such important work.

The services of the Committee on Publicity will here be in demand. Our preceding discussion of the influence of the Bulletin demonstrates that without an outside subscription list such influence is chiefly restricted to our own membership, while even with it that influence will extend but little outside of pharmaceutical circles. Now a little consideration will make it clear that the progress for which we are striving must depend ultimately on the outside public. It is that public from which our profession derives its support, and it is axiomatic that any successful advertiser must reach the source whence his patronage is derived. All signs of the times point to the coming rule of the people in all things, in this country. It is inevitable that many mistakes must be made during the process, but it is through these mistakes alone that real progress can be made, and it is the basic principle of a democratic form of government that it secures public progress by casting responsibility upon the people. He is indeed a dullard who cannot see that our people are rapidly acquiring greater discretion, better judgment and more stability as a result of this responsibility. It is the wise course, indeed the only permanently successful one, to take the people into partnership, and the American Pharmaceutical Association can in no other way hope to accomplish good and lasting results in establishing a successful basis for professional pharmacy. In no other line of work does this principle apply so closely as in that of securing legislation. While the vestiges of ring rule will doubtless persist, this practice, as a dominating method of government, is dead, and there will be increasing difficulty in the future in enacting and maintaining any important legislation not first sanctioned by the people.

Upon these considerations depends the necessity of our maintenance of a genuine work of publicity, through the public press, and in other ways. My views on this subject have been communicated in detail to our present committee and some work has been already based upon them, an account of which will doubtless be submitted to you in regular course.

Much of the work of these committees, in order to produce useful results, necessitates expenditures of money, sometimes in considerable amount. To this my personal experience has borne eloquent testimony. During the last year I have pursued the policy of permitting no needed work to go undone through the want of any money that I could supply. The cost of this procedure has not been inconsiderable, notwithstanding that the work was purely of a preliminary character. What I know of the limitations in the past work of our committees convinces me that one of the chief causes of unsatisfactory results has been the want of necessary funds, although, as might naturally be expected, committees have not been free in publishing this fact. Something should certainly be done to correct this difficulty.

Doubtless many minds are now following me with the question, possibly sarcastic, "Where is the money to come from for carrying out the liberal financial policy that is

being recommended to us?" I have previously quoted our Treasurer as saying that our membership dues are not alone sufficient to support our present activities. I am convinced that some of the more important of the expenditures herein recommended will yield a cash profit after a time. In the meantime, where is the capital for the proposed investment? I reply, first, from the invested funds. I am not in favor of the policy of allowing the income of the Ebert bequest to accumulate until it reaches a fixed amount. If up to one fixed amount, then why not up to a greater one? On what basis are we to fix the limit to which the process of accumulation is to go? We need that income now more than we shall hereafter, and its increase, expended as I have suggested, will be greater than that which will result from compounding its interest. It has always been found that the best way for such bodies as ours to get more money is to judiciously expend, in good work, all that they can afford of what they now have. It is not specially encouraging to a liberal policy on the part of those from whom we draw our income, to know that we have a considerable sum of money on interest and accumulating. It by no means follows that your President recommends that a point should be made of expending our income. The recommendation is rather a negative one, to the effect that, while we do in a general way favor the policy of accumulation, we should not refrain from any expenditure that is likely to do the Association more good than would result from the act of hoarding. The case of the Endowment Fund is quite a different one. There we have a fund originally established for a different purpose. To continue this process indefinitely, in relation to other funds; to establish a drain upon our membership wholly for the relief of those who come after us, is going too far in a good direction. It would be far more valuable to bequeath to our successors a well-organized and successful working policy, than any amount of cash in the treasury of a weak and inefficient organization.

There is, however, a much more efficient method of adding to our annual working funds, and one by no means difficult. This is the establishment of a new class of members, to be known as "Sustaining Members." Such members would be those voluntarily undertaking to pay into the treasury an annual fee in addition to that paid by ordinary members. They might be annual or life members, or those of any class whatever, who felt that they could afford such an annual contribution to our working funds. They should enjoy no special rights or privileges, and they should be free at any time, on notification to the Council, to retire from the proposed class. This plan has been found to work excellently in every society where I have seen it tried. There can be no question that there are many members of our Association who would not suffer at all from a contribution of ten dollars or more per year in addition to their regular dues. I believe, indeed, that if such a class of members were now organized, more than a hundred would be found just as soon as the fact became generally known. I, therefore, recommend that the Council be instructed to provide for such a class of members.

It is probable, and it is certainly to be hoped that our proceedings at this meeting will deal largely with pharmacopœial matters. Indeed, it was with this hope and expectation that the date of the meeting was so changed as to bring it before that of the U. S. P. convention. In relation to this subject, our Association has a duty of high importance to perform in the interest of the citizens of this nation. It is not to be expected that any body of specialists will be equally well informed on all sides of so great a subject as that of the functions and influence of the Pharmacopœia, and it is therefore the more important that each such body shall insist upon and stand for the recognition of those facts and principles of which, through its specially favorable position, it has knowledge, lest other bodies not in a similar position, should, through such specific ignorance, influence unwise action. As illustrations in point, I will remind you of some of the recommendations which have been published during recent months. One is that *hydrastis* should be dismissed from the Pharmacopœia because it is not used to any ex-

tent. Another is that when two drugs have essentially the same action, one of them should be dismissed. The most typical case of this kind that could be suggested is that of veratrum and aconite. Another is that when an active constituent fully represents the medicinal action of a drug, the latter should be dismissed. Probably the suggestion is meaningless, as there are no such cases, but if there are any, they would be found in nux vomica and strychnine, in aconite and aconitine, so that the suggestion calls for dismissing nux vomica and aconite and their preparations. Another is to reduce the number of preparations of a single drug. Although the idea here involved is not a bad one, the suggestion comes from sources which consider only the preference of a prescriber, and which wholly ignores the requirements that are made upon the practicing pharmacist. It is probable that all of the above suggestions will find strong support at the convention.

It is to be remembered that in this question concerning admissions to and deletions from the Pharmacopœia, the real issue between physicians and pharmacists is the unwillingness of the former to permit the Pharmacopœia to afford those provisions which are absolutely essential to the convenient, successful and safe performance of the pharmacist's duty, and to the welfare of great numbers of patients of those physicians whose practices in the selection of drugs differ from those of the objecting body. Let us deny to the more conservative element of the medical profession nothing that it asks in the performance of its proper functions. If it desires that the Pharmacopœia should make a point of indicating in some emphatic manner which drugs and medicines have the approval of the wiser members of the profession, we will join hands with them in an attempt to secure such action; but let us unite in refusing any demands or requests which are based upon the assumption that our own interests are not entitled to proper consideration by them, or that any considerable number of people should be made to suffer a penalty because they chance to be the patients of less competent medical advisers. It therefore becomes our duty to express ourselves upon this subject, so that the Pharmacopœia Committee may understand that we represent the belief and determination of our profession as a whole. I therefore direct your attention to a few fundamental facts and principles bearing on this subject.

1. It is a fact, perfectly well established by fifty years of official experience, that the admission to or the deletion from the Pharmacopœia of an article has scarcely a perceptible influence upon the extent of its use. When dismissed from the Pharmacopœia because the very best professional judgment regards it as therapeutically valueless, it will continue to be used as before, the only effect being to deprive pharmacists and their patrons of official standards for its control.

2. Many articles of little therapeutic activity, yet in common use, whether wisely or not, may, through their contained impurities, seriously affect the physical, chemical or therapeutical properties of prescriptions into which they enter, so that it becomes necessary for their purity to be safeguarded.

3. The primary object of the Pharmacopœia is not to teach therapeutics, to influence therapeutical practice or to create an incorrect, however creditable impression regarding it, but to respond to the demands of such practice by providing suitable information and standards for rendering it as safe and efficient as the conditions permit.

4. All preceding revisions of the Pharmacopœia have been based upon the declared principle that it is the actual use of an article that is to determine its recognition in the Pharmacopœia, in spite of considerations as to its therapeutical merit.

It would be out of place in a presidential address to discuss Pharmacopœial revision *per se*, and these suggestions are made in order to impress the importance of the duty of this Association to take definite action in applying that knowledge and judgment which especially pertain to it.

One more direction in which such duty applies may well be pointed out, namely, the

necessity for more definite standards. One of the most baneful possible conditions as to its power to cause errors of judgment, or to provide for unjust discrimination, or an accusation of it when it does not exist, is a want of definiteness in the expression of a standard. The Pharmacopœia is now replete with defects of this class. Many of its definitions are absolutely meaningless and a larger number of its descriptions and directions are incapable of enabling a positive decision to be reached.

I therefore recommend that the Association reiterate, as its conviction, a statement found in the sixth revision of the Pharmacopœia, and which has governed all subsequent revisions, that it is "best to refrain from dropping drugs and preparations which are, on inquiry, found to be in rather more than purely local use," also in another proposition, submitted by Professor Oldberg and adopted by the Committee of Revision in 1890, to the effect that the primary consideration in the recognition of a medicinal article by the Pharmacopœia is the fact that it or its preparations is in common occurrence in the pharmacy, rather than consideration of its therapeutical importance or value.

That it is the opinion of this Association that the definitions, descriptions and tests of the Pharmacopœia should be so fully and definitely stated as to insure as far as is practicable against misunderstanding or failure in interpretation by those employing the book.

It is doubtful if any subject has ever engaged the attention of this Association that is more complex and difficult, and yet of such far-reaching importance, as our relations to and attitude toward the National Formulary. Without introducing any discussion of the test of that work, reference may be made to a fact regarding which all will doubtless agree, that there is a peculiar danger that the influence of this work will be abused, and that the results of such abuse may widen instead of closing the breach between the two professions. If it shall appear to the medical fraternity that the professed campaign of the pharmaceutical profession against the abuse of nostrums is in reality only a concealed attempt to transfer this abuse, and in an exaggerated form, to other hands, it cannot be expected to, and should not, sympathize with it. It thus becomes highly important that the treatment of articles admitted to the Formulary be most carefully considered as to their influence upon medical practice, and upon the administration of the law. The legal recognition of the U. S. P. rests upon certain well-defined and securely established facts and principles. In its revision are directly represented, upon an absolutely equal footing, all branches of both professions, while to these are indirectly added all branches of theoretical and applied science which are contributory to the work of the two professions, and all state and national departments which have to do with the work of these professions. It is eminently proper that such a work should receive government recognition. On the other hand, without suggesting a criticism of the N. F. as to its character and origin, the very best that could possibly be said of it is that it emanates from one of these two professions only, and that it is wholly controlled by one of the organizations within that profession. It therefore does not rest upon the same broad foundation as does the U. S. P. and should not, by even the most liberal possible interpretation be accorded an equal standing. Be it noted again that this conclusion is not based upon any criticism of the work whatever, but upon the most favorable view that its best friends can take of it. To me it has become clear that if the N. F. is to retain its place as a legal and professional authority, its revision and control must be assumed by the same body that controls the Pharmacopœia, and it must be given place as a supplement to that work. I hesitate to risk weakening the force of a conclusion thus based upon principle alone, by adding any discussion of matters of expediency; yet there are considerations of this character which are also of great weight. The public demands which have been made during the last year for the great extension of the range of the pharmacopœia are of such a nature, and so powerful that they should not, cannot and will not be disregarded by the government of this country. One of two things will happen; either the two professions will yield to the demand, and devise a method tending most fully to con-

serve all interests, or one will be forced upon them that may show little regard for their special interests and views. Considerations of expediency, therefore, force us in the same direction as considerations of principle. This demand upon the Pharmacopœia Convention is incompatible with the views of an important element of the medical profession, and an important minority of the pharmaceutical profession, so that we see, with certainty, a conflict impending. The N. F., in the capacity of a supplement to the U. S. P., provides a perfect medium for acceding to this compelling demand without exacting any undue concession from those who oppose it. I therefore recommend that a committee, of which the Chairman of the Formulary Committee be a member, be appointed by the President immediately at the close of the reading of this address, to consider the desirability and the practicability of the publication of the National Formulary by the U. S. Pharmacopœia Convention, and, in case they approve, to submit to us before the close of this convention, a plan for bringing about the change recommended.

It may be added that such a disposition of the Formulary would not in any way prevent this Association from continuing to publish a work containing any articles the legal importance of which is not deemed by the U. S. P. Convention to be sufficient to justify their admission to either the Pharmacopœia or the Formulary.

Our Association should never lose sight of its relation to pure food and drug legislation and to the enforcement of its provisions after their enactment. We have wisely refrained from offering opinions or advice concerning the physiological properties of articles in dispute, feeling that, however strong the opinion which we entertained, we should be careful not to intrude upon the domain of the medical profession. Once a statute is enacted, however, our attitude is necessarily changed, for it is one of the solemn obligations upon which we have entered, to lend our aid in enforcing provisions thus established. Not alone are we interested in the provisions relating to drugs. A food and drug act is one entity, and its integrity in one part is dependent upon its integrity as a whole. It is the duty of this Association, and its appropriate committees should be so instructed, to observe and inquire into the administration of the Food and Drugs Act. It is a standing reproach against American citizens that they are in the habit of securing the enactment of statutes and then failing to take any interest in their enforcement. This is a reproach which should never be allowed to lie against the American Pharmaceutical Association.

I believe that one of the most important considerations to which we can devote attention in this connection, especially at a meeting which is held upon the eve of the assembling of the Pharmacopœia Convention, is the growing tendency of scientific experts to sell their services as witnesses without regard to the merits of the case or even the truth of the statements to which they are testifying. It is not a mere question of the commission of naked perjury; there are many ways of giving testimony outside of the witness-stand. The real offense is the sacrifice of that sense of responsibility to the cause for which all scientific effort should ultimately be put forth—the establishment of absolute truth. It is deplorable that so great and general a laxity in this direction should have come to exist. It is to such people as ourselves that the great uninformed body of the people look for an example of their own course of action, and the influence upon them of seeing us disregard our duty is ruinous to the public morals. What is to be expected from the students of an institution who see the professor to whom they look for an example go upon the witness-stand and, for a fee, swear to the exact opposite of that which he has been teaching them as the truth in his instruction course? Can it be expected that such influences will tend toward the training of pharmacists bent upon a conscientious discharge of their professional duties?

I do not know that any specific action by our organization toward amending this defect is possible, but it is quite practicable for us to keep it in mind whenever we are called upon to consider problems in which this influence enters as a factor.

The most serious danger which has ever threatened our profession now looms comparatively near at hand. I refer to the enlistment of vast amounts of capital in the crushing out of individual enterprise, in the elimination of professional responsibility, in the reduction of professional employees to a state of serfdom, and in the destruction of an honest means of livelihood on the part of great numbers of people engaged in pharmaceutical pursuits. That this attempt will become successful unless effectively opposed is manifest when we note that the same means are being employed which have already proven successful in other lines, and which are now applied to ours with the additional advantage of successful previous experience. The interests engaged in this work are the most deadly possible enemies of all the objects of our Association and of all other institutions in which educational and professional ideals are cultivated.

How shall we meet this stupendous danger? To this question I have been able to see but one answer and that is through the strength of union. We must in this instance fight fire with fire. While it is not appropriate for me at this time to discuss either the merits or demerits of the American Druggists' Syndicate, or to enter into any discussion of its past history, I feel that I should not refrain from directing your earnest and studious attention to the plan by which it proposes to fight this common danger. I am convinced that this plan, or some modification of it, is the only one which promises any hope of success. Without submitting any recommendation in the premises, I offer the opinion that it would be a most happy consummation to discover some satisfactory ground for a community of action, between two institutions whose interests harmonize in so many ways as do those of the A. Ph. A. and A. D. S.

The Association is to be congratulated upon the completion and publication of the National Pharmaceutical Syllabus, in the preparation of which it took an active and important part. Although this Syllabus is doubtless imperfect, and is to be regarded merely as the foundation stone of an important future structure, it must yet serve, even in its present condition, as a most important means for bringing about harmonious desire and effort, even if not at once harmonious action, between instructors and examiners.

In connection with the subject of education and legislation, I would direct your attention to the great desirability of the imposition of some educational and professional requirements, with a corresponding license, for engaging in commerce in drugs and medicines. If we go no farther than to institute a comparison between the extent of the danger of errors and offences committed in a wholesale way with those referring to the retail pharmacy, it would follow logically that there is a greater need of safeguards against the former than against the latter. The reasons, however, which appeal to us are of a far more definite and specific nature. It is unquestionably true that a vast majority of the collisions between importers and wholesale dealers in drugs and administrative officers of the government result directly from the ignorance of the former as to the nature and final effect of the imperfections in their stocks, of which the latter complain. Is it not the height of absurdity to assume that a dealer whose information regarding the nature, composition and properties of a drug, consists of little more than an accumulation of errors, would be likely to take a correct view of the proper requirements concerning such an article? As a matter of fact, it is an every-day occurrence for such dealers to submit requests, or more frequently to make demands, upon the authorities which are radically opposed to all professional interests in the article under consideration. It is my firm conviction, based upon a very long experience and a careful study of this subject in all its relations, that a special course in pharmacognosy, with a subsequent examination and license, should be required of every person having immediate charge of an importing or trading business in drugs and chemicals, and I recommend that our Committee on National and State Legislation be instructed to make suitable inquiry into this subject.

Our annual meetings should be made as attractive as possible. I have passed through the stage where I grudged the time taken from the working program for the social entertainment, and I have come to place a very high estimate upon the value of the latter as furthering the success of the former. The problem of providing fully for both has proved a difficult one, but I believe that it is solved, in principle, by the recommendation made last year by President Oldberg, looking toward the more extensive performance of work by the Council. A danger is here involved which must be thoroughly safeguarded. The Association should never lose its grip upon the proceedings of the Council. Whatever is done by the Council should be considered, and intelligently considered, by the Association, before being approved; yet it is possible to reach the best results in a vast majority of cases, in the transaction of business, by leaving the Council to perform the bulk of the work of study, discussion and deliberation.

A Council bearing these enlarged responsibilities should embody a pretty full representation of ex-presidents, and it seems to me desirable to renew a recommendation once made by President Whelpley that a retiring president should become, ex-officio, a member of the Council, either permanently or for a considerable period. Only one who has filled the office of president can comprehend the increased knowledge and enlarged view that the position must bring to him who makes any proper attempt to perform his duty. The presence in the Council of those who have thus been educated in the Association's affairs, cannot fail to be of the greatest value to us. Having myself already been elected to the Council for the ensuing three years, I am enabled to make this recommendation without the delicacy that might otherwise be felt.

In my use of the alphabetical list of members printed in the Proceedings, I have often been greatly embarrassed by my inability to find recorded the professional titles of the members. Ordinary rules of courtesy require that persons be addressed, especially in correspondence, by their appropriate titles, and it is very humiliating for an officer of the Association to be unable to ascertain how he ought to address his correspondent. Many years ago objections were made upon the floor of this Assembly to having members addressed by their titles. There was no concealment of the motives promoting the objection. Those who had no titles regarded it as invidious that others should be accorded them. The sentiment always appeared pitiful to me, and I am happy in the belief that it finds few supporters in these more liberal times. Certainly such a restriction should not extend to a printed directory which is maintained solely for information and convenient reference. I therefore recommend that the Secretary be instructed, so far as he possesses the necessary information, to append to the names of members in our official directory, their proper academic and professional titles.

Hearty applause followed the reading of the President's address.

The Vice-President said that all had listened with a great deal of interest to this able and comprehensive address of the President. He asked whether it should be referred to a committee for consideration and report at a later session.

Mr. W. C. Anderson, of Brooklyn, moved that the recommendation of the President that a Committee be appointed by the Chair immediately after the close of the reading of the address, to consider the desirability and practicability of the publication of the National Formulary by the U. S. Pharmacopœial Convention, be concurred in, and that the remainder of the address be referred to a committee of five, for consideration and report at a later session. This motion had a second in Mr. H. L. Taylor, of Albany, and the motion was put to vote and carried.

Under the motion as passed, Vice-President Lowe appointed the following as a Committee on President's Address : James H. Beal, of Scio, Ohio ; Charles Holzhauser, of Newark, N. J. ; Henry C. Blair, of Philadelphia ; F. C. Godbold, of New Orleans, and Caswell A. Mayo, of New York. The Vice President stated that the President would appoint the Committee on National Formulary provided for under the resolution just adopted.

President Rusby resumed the chair.

The General Secretary said that he felt that he voiced the sentiment of the members present in offering a motion that he be instructed to send by wire the cordial fraternal greetings and best wishes of the officers and members of the American Pharmaceutical Association to Samuel A. D. Sheppard, of Boston ; Charles E. Dohme, of Baltimore, and Oscar Oldberg, of Chicago, three prominent members who were prevented by illness from being present at the meeting to-day. President Rusby suggested that the name of F. J. Wulling, of Minnesota, be added to that list, for a telegram of condolence and sympathy, stating that Mr. Wulling had come to the Richmond meeting, but shortly after his arrival received telegraphic information announcing the death of his father. He said he felt sure Mr. Wulling would appreciate an expression from the Association under the circumstances. Mr. Henry M. Whelpley, of St. Louis, moved to add to the list for a telegram of kindly greeting the name of the venerable Enno Sander, of his city, Mr. Sander being the oldest living ex-president of the Association, and having recently celebrated his 88th birthday. Mr. R. H. Walker, of Texas, suggested the addition of the name of Doctor John B. Bond of Little Rock, Arkansas, who was reported quite sick. The motion of the Secretary as so amended was put to a vote and carried.

The President asked the Secretary if he had any other business to which to call the attention of the Association at this time, and the Secretary stated that it was in order now to call a list of the various standing and special committees as notice to their chairmen to have their reports ready by to-morrow morning's session for presentation and discussion. He thereupon called the following list of committees, with the names of their chairmen :

Committee on the U. S. Pharmacopæia—Geo. M. Beringer, Chairman.

Committee on National and State Legislation—Samuel L. Hilton, Chairman.

Committee on Transportation—Caswell A. Mayo, Chairman.

Committee on Time and Place of Next Meeting—T. W. Jones, Chairman.

Committee on Organisation of Local Branches—Caswell A. Mayo, Chairman.

Committee on Pharmaceutical Collection at Washington—Murray Galt Motter, Chairman.

Committee on Reorganization—C. S. N. Hallberg, Chairman.

Committee on the William Procter, Jr., Monument Fund—John F. Hancock, Chairman.

Committee on Publicity—Francis B. Hays, Chairman.

General Committee on Membership and Reception—William B. Day, Chairman.

Committee on Patents and Trademarks—Thomas V. Wooten, Chairman.

Committee on the Bulletin—F. J. Wulling, Chairman.

Committee on Weights and Measures—Henry Kraemer, Chairman.

Committee on Status of Pharmacists in Government Service—George F. Payne, Chairman.

Committee on Parcels Post—W. S. Richardson, Chairman.

Committee on Drug Reform—L. E. Sayre, Chairman.

Committee on the Drug Market—E. L. Patch, Chairman.

Committee on the National Formulary—C. Lewis Diehl, Chairman.

Committee for Standard of Non-Official Drugs, Pharmaceutical Preparations and Chemical Products—Geo. M. Beringer, Chairman.

Delegates to the National Association of Retail Druggists—C. Lewis Diehl, Chairman.

Delegates to the National Wholesale Druggists' Association—Harvey W. Wiley, Chairman.

Delegates to the Section on Pharmacology of the American Medical Association—Jos. P. Remington, Chairman.

President Rusby here named the following as the Committee provided for upon the recommendation of the President's Address, to consider the desirability of the publication of the National Formulary by the U. S. Pharmacopœial Convention: Joseph P. Remington, of Philadelphia; W. C. Anderson, of Brooklyn; George M. Beringer, of Camden, N. J.; C. Lewis Diehl, of Louisville; Lyman F. Kebler, of Washington City.

The Chair here gave opportunity to Mr. Beal, of Ohio, to submit some proposed amendments to the By-laws, to be voted on at the next session. Mr. Beal thereupon offered the following:

Amend Chapter X, Article I, line 1, by changing the word "ten" to "eleven;" insert after the sixth word, line 3 (members), the clause "a committee on the pharmaceutical syllabus of seven members."

Add Article XII, Chapter X, the Committee on the Pharmaceutical Syllabus shall be appointed by the President of the Association as follows: One member shall be appointed for seven years, and one for six, five, four, three, two and one years respectively; each vacancy occurring from expiration of term shall be filled for a term of seven years; other vacancies shall be filled at the annual meetings of the Association for the unexpired terms. This committee shall report to the Association through the Section on Pharmaceutical Legislation and Education, shall be members of the National Committee on the Pharmaceutical Syllabus and shall recommend to the Association its proportionate share of the current expenses.

Mr. Beal explained that the sole purport of these proposed amendments was to create a new committee of seven members, which should be known as the Committee on Pharmaceutical Syllabus, and to define the length of their terms, the manner of their appointment and their duties.

The Chair explained that this motion to change the By-Laws would, under the rule, have to go over to the next session for action.

The Chair then called on the Committee on Time and Place of Next Meeting for report, and explained that the acting Chairman of that Committee, Mr. Sayre, of Kansas, had reported to him that he was the only

member of the Committee present, and he had authorized him to complete the Committee by appointment from those present at this meeting. The report was not ready to be presented at this time.

The Chair then declared a recess of five minutes under the By-Laws, to give the members present from the various States and Territories an opportunity to select their representatives upon the Nominating Committee, now in order to be appointed. At the expiration of the recess, the Secretary called the roll of the various States, Territories, Island Possessions and Provinces of Canada, and the Nominating Committee was made up as follows :

<i>For Arkansas</i> —Wm. L. Dewoody.	<i>For Missouri</i> —J. M. Good, H. S. Merrell, Jr.
<i>For Colorado</i> —S. L. Bresler, Chas. M. Ford.	<i>For Nebraska</i> —Mrs. Belle Heilman.
<i>For District of Columbia</i> —L. F. Kebler, M. I. Wilbert.	<i>For New Jersey</i> —Chas. Holzhauser, E. B. Jones.
<i>For Florida</i> —Ernest Berger, Wm. O. Richtmann.	<i>For New Mexico</i> —A. J. Fischer.
<i>For Georgia</i> —Geo. F. Payne.	<i>For New York</i> —Thos. P. Cook, O. Raubenheimer.
<i>For Idaho</i> —John Pulse.	<i>For North Carolina</i> —W. W. Horne, E. V. Howell.
<i>For Illinois</i> —Wm. Bodemann, C. S. N. Hallberg.	<i>For Ohio</i> —C. A. Dye, Theo. Wetterstroem.
<i>For Indiana</i> —F. W. Meissner, E. G. Eberhardt.	<i>For Oklahoma</i> —J. C. Burton, W. F. Dodd.
<i>For Iowa</i> —W. F. Teeters.	<i>For Oregon</i> —Geo. C. Blakeley, C. W. Huntley.
<i>For Kansas</i> —M. Noll, L. E. Sayre.	<i>For Pennsylvania</i> —J. L. Lemberger, John F. Patton.
<i>For Louisiana</i> —F. C. Godbold, Philip Asher.	<i>For Vermont</i> —W. F. Root, A. O. Austin.
<i>For South Dakota</i> —E. C. Bent, D. F. Jones.	<i>For Virginia</i> —A. G. Briggs, J. L. Avis.
<i>For Tennessee</i> —W. R. White, J. O. Burge.	<i>For Washington</i> —P. Jensen, C. W. Johnson.
<i>For Texas</i> —Miss V. Brookes, R. H. Walker.	<i>For West Virginia</i> —W. E. Dittmeyer, W. C. Price.
<i>For Maryland</i> —J. F. Hancock, A. R. L. Dohme.	<i>For Wisconsin</i> —Otto Boberg.
<i>For Massachusetts</i> —E. H. LaPierre, F. A. Hubbard.	<i>For the Association at Large</i> —J. P. Remington, J. H. Beal, E. G. Eberle, E. L. Patch, H. M. Whelpley.
<i>For Michigan</i> —H. B. Mason, J. O. Schlotterbeck.	
<i>For Minnesota</i> —W. A. Frost, A. D. Thompson.	

There being no other business before the Association at this session, on motion of Mr. Payne, of Georgia, the Association stood adjourned until to-morrow (Wednesday) morning at 10 o'clock.

SECOND SESSION—TUESDAY AFTERNOON, MAY 3, 1910.

No business was transacted by the Association previous to the first sessions of the Section on Commercial Interests and the Section on Scientific papers.

THIRD SESSION—WEDNESDAY MORNING, MAY 4, 1910.

The third general session was late in assembling, on account of a prolonged session of the Council, and was not called to order by President Rusby until 10:50 a. m., when the Secretary read the minutes of the first session, which the Chair stated would stand approved as read, without objection, and it was so ordered.

The Chair called for the report of the Nominating Committee as the next business in order, and Mr. Whelpley, of that Committee, presented the same as follows:

RICHMOND, VA., May 4, 1910.

To the Officers and Members of the A. Ph. A.:

The Nominating Committee met at 8:30 p. m., May 3rd, with fifty-three members present and nominated the following officers:

For President—J. G. Godding, Boston, Mass.; F. C. Godbold, New Orleans, La.; T. Ashby Miller, Richmond, Va.

For First Vice-President—W. A. Frost, St. Paul, Minn.; Wilhelm Bodemann, Chicago, Ill.; George C. Blakeley, The Dalby, Ore.

For Second Vice-President—C. M. Ford, Denver, Colo.; F. W. Meissner, Jr., La Porte, Ind.; Fred A. Hubbard, Newton, Mass.

For Third Vice-President—Ernest Berger, Tampa, Fla.; J. O. Burge, Nashville, Tenn.; Chas. Holzhauser, Newark, N. J.

For the Council—E. C. Bent, Dell Rapids, S. Dak.; Erich H. Ladisch, Chicago, Ill.; Jas. M. Good, St. Louis, Mo.; E. G. Eberle, Dallas, Texas; A. M. Roehrig, Buffalo, N. Y.; Geo. F. Payne, Atlanta, Ga.; Theo. D. Wetterstroem, Cincinnati, Ohio.; Mathias Noll, Atchison, Kans.; Otto Raubenheimer, Brooklyn, N. Y.

Respectfully submitted,

J. P. REMINGTON, *Chairman*,
H. M. WHELPLEY, *Secretary*.

The Chair called for action upon the report of the Nominating Committee just read, and Mr. Cook, of New York, moved that the report be received and adopted as the sense of this Association. There were several seconds to this motion, and it was carried unanimously.

The Chair called for the reading of the minutes of the Council as the next order of business, and Mr. J. W. England, Secretary of the Council, read the minutes of the second session of that body, as follows:

MINUTES OF COUNCIL OF A. PH. A.

The second meeting of the Council of the American Pharmaceutical Association for 1909-10 was held May 2, 1910, at the Hotel Jefferson, Richmond, Va., at 3:30 p. m., Chairman Godbold presiding. Present: Messrs. Godbold, Koch, Whelpley, Eliel, Hallberg, Raubenheimer, Rusby, Chas. Caspari, Jr., C. E. Caspari, Asher, Bowman, Miller, Eberle, Wilbert, Motter, Diehl, LaWall, LaPierre, Johnson, Thomas, Meissner and England.

Chairman Godbold made the following opening address:

To the Members of the Council: After looking through the proceedings of the past five years, in search of an address made by one of my predecessors, and finding none, I concluded that it was not customary for the Chairman to make an annual address, and while I feel that I had something that I would like to say to the members, concluded to follow

the custom. Later, however, I read the following from Emerson, "Of no use are the men who study to do exactly as was done before, who can never understand that to-day is a new day."

I concluded that I would take advantage of the opportunity to say that when I was elected Chairman of the Council, I was so impressed with the drubbing that I would necessarily have to undergo, in being broken in as Chairman, that my whole thought was, how much I would have preferred that my opponent had been elected; and I so expressed myself at the time, neglecting to express my thanks to the members for the honor they had conferred upon me. So I want to say at this time that I fully appreciate the honor and the confidence implied by my selection as your Chairman, and I thank you all most heartily.

It has been very gratifying to me to note how promptly the members have voted upon the Council questions sent out in letters.

For a number of years I have thought it would be a good plan for the Association to issue a monthly journal, and I understand that the Committee on Bulletin of the Association has been considering the question, and while I do not wish to anticipate the report of the Committee, I want to call your attention to the subject, for I certainly feel that it would be of great value to our Association if we could have an official organ reporting, each month, on all interests of the Association. Whether it is practicable or not, at the present time, to do this, will doubtless be reported upon by the Committee on Bulletin.

Respectfully submitted,

F. C. GODBOLD.

Secretary England presented the following synopsis of the business transacted by the Council, by mail, since the last session held at Los Angeles, Cal., August 20, 1909:

Council Letter No. 1—Philadelphia, Pa., October 12, 1909.

Motion No. 10—That T. Ashby Miller, who served in a very satisfactory manner as Local Secretary for the 1900 meeting, be elected Local Secretary for the 1910 convention at Richmond; and also to be Chairman of the Committee on Arrangements, with power to appoint his associates.

Motion No. 11—That the Treasurer be authorized to invest five thousand dollars of the current funds in municipal or state bonds, the investment to be made on approval of the Committee on Finance and the Chairman of the Council.

Motion No. 12—That the By-Laws of the Association, relating to the number of sessions of the Section on Scientific Papers, be suspended, and that the Section be permitted to hold a sufficient number of adjourned sessions to consider and discuss all the communications that may be presented to it.

Motion No. 13—That the Committee on Publication be instructed to print in the volume of Proceedings each year, under the heading, "General Rules," all motions and resolutions adopted by the Council of the Association that remain in force for more than one year, but do not amend the Constitution, By-Laws nor Rules of Finance. The General Rules are to be printed on a page following the Rules of Finance.

Motion No. 14—That Jacob Jesson, of Ontario, Cal., on payment of \$25.00, be made a life member, to receive the Proceedings.

Motion No. 15 (Committee on Invested, Savings and Trust Funds).

WHEREAS, The various permanent funds of the Association are mainly invested in public bonds which mature from time to time, thus necessitating reinvestment, and

WHEREAS, The Albert E. Ebert Legacy will shortly be paid into the treasury, and

WHEREAS, The investment of said permanent funds, legacy and other trust funds held by the Association should always be made with due caution, and only after careful deliberation, therefore be it moved by E. G. Eberle and seconded by M. G. Mutter that the following be adopted as Rules of Finance:

The Chairman of the Council is instructed to appoint three members of the Association who, together with the Treasurer, shall be known as the "Committee on Invested, Savings and Trust Funds."

Of the three members first appointed, one shall be appointed for one year, one for two years and one for three years. Each year thereafter, one member shall be appointed for three years.

Members of the committee need not be members of the Council.

It shall be the duty of the said committee to carefully consider the nature and status of all invested, savings and trust funds of the Association, and to make an annual written report upon the same to the Council, which report shall be read (in full) at one of the general sessions of the annual convention of the Association, and published in full in the annual "Proceedings" thereof.

The present custody of the funds shall not be affected by the adoption of these resolutions, neither shall the committee have power to invest or re-invest any of such funds, except as instructed by the Council or the Association.

Motion No. 16 (Election of New Members)—Applicants for membership Nos. 1 to 14 elected.

Prof. J. P. Remington advises the Secretary of the decease on October 7, 1909, of Prof. William M. Searby, of San Francisco, a member of the Council.

Council Letter No. 2. Philadelphia, November 3, 1909.

Resolutions on Death of W. M. Searby.

WHEREAS, The American Pharmaceutical Association has suffered a severe loss in the death of one of its most earnest and zealous members, Ex-President William Martin Searby, of San Francisco, Cal., therefore, be it

Resolved, That we place on record our deep appreciation of his sterling worth and unflinching honesty, and

Resolved, That we bear testimony to his able services on behalf of American Pharmaceutical Association, and

Resolved, That we mourn his demise as the loss of one whose work and worth as a man and fellow Pharmacist will live long in our memories.

The Chairman of the Council received a communication from C. Lewis Diehl, Chairman of the Committee on the National Formulary, regarding reports on work in National Formulary.

The Nominations of Committee Members, as made by the Chairman of the Council, approved by the Council members.

Motion No. 19. That Charles E. Whilden of 135 Stockton St., San Francisco, Cal., be nominated as a member of the Committee on Transportation to succeed W. M. Searby, deceased.

Motion No. 20. That the sum of Fifty Dollars (\$50.00), be appropriated to cover the expense of the Committee on U. S. P., Geo. M. Beringer, Chairman.

Motion No. 21 (Election of New Members). Applicants for membership: Nos. 15-18 elected.

Motions Nos. 10 to 16, inclusive (Council Letter No. 1), all carried.

At the meeting of the Baltimore Branch, held October 21, 1909, John B. Thomas was elected to represent the branch in the Council, succeeding D. M. R. Culbreth.

Council Letter No. 3—Philadelphia, November 13, 1909.

Motion No. 22—That the time for holding the fifty-eighth annual meeting be changed from May 16-20, inclusive, to May 3-7, inclusive, which will give ample time for sight-seeing in the city of Richmond and its surroundings on Sunday and Monday, May 8th and 9th, and to reach Washington, D. C., in time for the opening session of the United States Pharmacopoeial Convention on Tuesday, May 10, 1910.

Motion No. 23—That a further appropriation of two hundred dollars (\$200.00) be made for miscellaneous expenses for the current fiscal year.

The following communication has been received:

"The Committee appointed to nominate members for the Committee on Unofficial Standards reported as follows:

For the Term of One Year.

George M. Beringer, Camden, N. J.	Chas. E. Caspari, Jr., St. Louis, Mo.
A. I. Cohn, New York City.	John M. Francis, Detroit, Mich.

For the Term of Two Years.

H. P. Hynson, Baltimore, Md.	Geo. B. Kauffman, Columbus, Ohio.
L. F. Kebler, Washington, D. C.	J. A. Koch, Pittsburgh, Pa.

For the Term of Three Years.

Henry Kraemer, Philadelphia, Pa.	E. H. Ladish, Chicago, Ill.
C. H. LaWall, Philadelphia, Pa.	W. A. Puckner, Chicago, Ill.

For the Term of Four Years.

Otto Raubenheimer, Brooklyn, N. Y.	G. D. Rosengarten, Philadelphia, Pa.
C. E. Vanderkleed, Collingswood, N. J.	M. I. Wilbert, Washington, D. C.

The Committee further nominates George M. Beringer for Chairman of the Committee on Unofficial Standards.

It is further recommended that the Nominating Committee be continued and empowered to present nominees to any vacancies in the above list caused by the refusal of any of those named to serve.

J. H. BEAL,
J. A. KOCH,
PHILIP ASHER,
Committee."

Motion No. 24—That the above report be accepted and the recommendations agreed to.

Motions 17 to 21, inclusive (Council Letter No. 2), all carried.

The Council is advised under date of November 8, 1909, that Frederick J. Wulling, of Minneapolis, has been re-elected as a member of the Council to represent the Northwestern Branch.

Chairman Godbold announced that in accordance with Motion No. 15 (Council Letter No. 1) he appointed the following "Committee on Invested, Savings and Trust Funds": J. H. Beal (three-year term), Chairman; Thomas P. Cook (two-year term) and Treas. H. M. Whelpley, *ex-officio* (one-year term).

Council Letter No. 4—Philadelphia, November 24, 1909.

Motion No. 22—Providing that the time of holding the fifty-eighth annual meeting be changed from May 16-20, 1910, inclusive, to May 3-7, 1910, inclusive, carried by a large majority, only two votes being negative.

Motions Nos. 23 and 24 have carried also.

Chairman Godbold has appointed E. G. Eberle as the member for the *one-year term* of the Committee on Invested, Savings and Trust Funds. The other members of the Committee (Council Letter No. 3) are J. H. Beal (three-year term), Chairman; Thomas P. Cook (two-year term), and Treasurer H. M. Whelpley, *ex-officio*.

The nominations as made under Motion No. 24 (Council Letter No. 23) having been approved, the following motion is offered:

Motion No. 25—Do you vote for the Committee on Unofficial Standards as nominated?

H. P. Hynson declines nomination for Committee on Unofficial Standards; name withdrawn.

Motion No. 26 (Election of New Members)—Applicants for membership from 19 to 28 elected.

Treasurer Whelpley writes under date of November 5, 1909, that the St. Louis Branch is not doing sufficient work to be entitled to a Council member. Therefore, erase name of Otto F. Claus from list of A. Ph. A. Council members for 1909-1910.

Council Letter No. 5—Philadelphia, January 5, 1910.

Motions Nos. 25 and 26 have carried.

Chairman C. H. LaWall, of the Committee on Pharmaceutical Education and Legislation, has named John C. Wallace, of Newcastle, Pa., as a member of the Committee on Opium Legislation, to take the place of H. P. Hynson, of Baltimore, Md. (who has declined to serve), and Lyman F. Kebler, of Washington, D. C., to succeed the late Mablon N. Kline, of Philadelphia; this was subsequently approved through Motion No. 27.

Treasurer Henry M. Whelpley has, in accordance with Motion No. 11, Letter No. 1 (October 12, 1909), and on "approval of Committee on Finance and of the Chairman of the Council," invested \$5,000.00 current funds in bonds. The purchase was made on November 15th from A. G. Edwards & Sons, of St. Louis, of one registered St. Louis City Public Buildings and Public Works, Registered 4% Gold Bond, No. 717, due July 1, 1928, at 101 $\frac{1}{2}$ %, netting about 3.90 per cent. interest. This amounted to \$5,075.00, with \$74.44 interest, making a total of \$5,149.44. The bond is in the name of the American Pharmaceutical Association and placed in the Association's safe deposit box. This was approved through:

Motion No. 28 (Approval of Investment of Current Funds in Bond).

Motion No. 29—That the sum of \$25.00 be appropriated to pay the additional premium on the treasurer's bond.

This additional appropriation is made necessary by the fact that at the last annual meeting the bond of the Treasurer was increased from \$5,000.00 to \$15,000.00, while the budget of appropriations adopted at Los Angeles covered but \$12.50 for the premium, which latter under the present conditions amounts to \$37.50.

A safe deposit box for the Treasurer has been provided.

The General Secretary, the Local Secretary, and the Secretary of the Council, submit program to the Council for consideration.

Motion No. 30—Applicants for membership Nos. 29 to 54 elected.

Council Letter No. 6—Philadelphia, February 1, 1910.

Motions Nos. 27, 28, 29, and 30 (Council Letter No. 5) have carried.

Permission is asked by the National Association of Retail Druggists to use for comment parts of the text of the National Formulary in an edition of "The Modern Pharmacist" (which the organization is about to issue), as per specimen of formula in abstract submitted.

Motion No. 31—That permission be granted to the National Association of Retail Druggists to use the text of the National Formulary in abstract form in "The Modern Pharmacist," as submitted in application, such permission for similar form having been already granted to the American Medical Association, the U. S. Dispensary, the National Standard Dispensary, and others.

To the Chairman and Council: Thomas P. Cook, of New York City, nominated to fill the vacancy on the Committee on Unofficial Standards occasioned by the resignation of Henry P. Hynson by Nominating Committee of J. H. Beal, J. A. Koh, Philip Asher.

Motion No. 32—Do you approve the nomination and elect Thomas P. Cook to succeed Henry P. Hynson as a member of the Committee on Unofficial Standards?

Communication from Chairman Godbold presented to the members of the Council that the Chairman had received a letter from Prof. C. Lewis Diehl, Chairman of the Committee on National Formulary, to the effect that the work is progressing, and that if it is not interfered with, he has reason to hope that a final report can be presented at the annual meeting in Richmond.

Motion No. 33—Applicants for membership Nos. 55 to 80 elected.

Council Letter No. 7—Philadelphia, Pa., February 15, 1910.

Motions Nos. 32, 33 and 34 (Council Letter No. 6, p. 13), have carried.

Communication received from Otto Raubenheimer relating to Motion No. 31, against giving permission to the National Association of Retail Druggists to use, for comment, parts of the text of the National Formulary in an edition of the "Modern Pharmacist" (which the organization is about to issue).

George P. Hitchcock made a protest, also, to the Secretary of the Council, against Motion No. 31, asking that the motion be withdrawn.

This the mover of the motion declines to do.

George M. Beringer votes yes on Motion No. 31, with the suggestion that only approved formulas be abstracted.

Under date of January 27, 1910, the Secretary of the Council is advised by Secretary Day of the Chicago Branch of the A. Ph. A., that at the annual election held on the 25th, the Chicago Branch elected C. A. Storer, Rush and Ohio Streets, Chicago, Ill., representative of the Branch in the Council of the American Pharmaceutical Association.

The Chairman of the Committee on Bulletin submits a report on the additional expense growing out of the publication of the N. F. Reports in it, and urges that an additional appropriation be made to meet the exigencies of the case, and that it be paid out of the National Formulary Fund.

In this connection a statement was submitted by the editor suggesting that:

(1) The "Bulletin" for March, April and May be limited to 32 pages, in which case much of the Branch proceedings will have to be omitted, or

(2) To ask the Council that the entire appropriation, \$2,000.00, be allowed for the nine months of the "Bulletin" instead of twelve months, as intended by the Council when made at the annual meeting.

Motion No. 35—That as much as may be required of the two thousand dollars that have been appropriated for the "Bulletin" for the ensuing year be expended for the "Bulletin" up to and including May, 1910.

"That will relieve the Council of the immediate necessity of allowing an additional sum. The expenses of the "Bulletins" after May may be taken into consideration together with the recommendations that the Committee on Bulletin proposes to make to the Council at the Richmond meeting."

Motion No. 36—Applicants for membership Nos. 81 to 91 elected.

Council Letter No. 8—Philadelphia, Pa., Feb. 18, 1910.

The Committee on Invested and Trust Funds of the Association submits the following recommendations:

(1) That the money received from the Ebert Legacy be kept separate from the present Ebert Fund, and converted into a fund to be known as the "Ebert Legacy Fund."

(2) That the Ebert Legacy Fund be invested in municipal or other public bonds approved by the Committee on Invested Funds and the Finance Committee, and that it be kept intact and the income added thereto until the fund and its accumulations shall together amount to a total of \$10,000.

(3) That after reaching that sum the income derived from the fund shall be devoted to such purposes as will, in the opinion of the Council, best commemorate the founder of the fund and his services to pharmacy.

(4) That until such a fund has been established by the Council the receipts from the Ebert Legacy shall be deposited by the Treasurer in the International Bank of St. Louis, or other St. Louis bank, upon interest-drawing certificate or account.

(5) That the name of the present "Ebert Fund" be changed to the "Ebert Prize Fund," and that the Ebert Prize of \$25.00 be continued upon the same terms as heretofore. Any excess of interest above the amount awarded in prizes shall be added to the principal until the same shall amount to \$1,000.00, after which the entire annual interest upon the same shall constitute the "Ebert Prize."

The reason for the committee's suggestion that the old Ebert Fund and the Ebert Legacy be kept separate is, that the first was given by Mr. Ebert for a specific purpose, while the latter was given to the Association practically without restriction and with the evident intention that the Association should use it in the manner which it deemed best. It is evident that if the Ebert Legacy be added to the present Ebert Fund the rules covering the latter would apply to the whole, while the income would be much greater than was intended by the donor as a prize for the character of paper specified in the donation.

In case the preceding recommendations are agreed to by the Council, the committee recommends:

(6) That the Committee on Finance be authorized to invest all of the foregoing funds and also the General Endowment Fund of the Association in bonds of the city of Cairo, Illinois, to net 5 per cent. income or better, or in other municipal bonds of the same grade and amount of income return.

Such an investment would increase the net return over that now received from the aforesaid funds to the extent of not less than 25 per cent. annually.

(7) That we recommend to the Council and Association (at the next annual convention) the making of such changes in Article four of the Constitution as will permit the investment of the Life Membership Fund in municipal or other public bonds, as well as in Federal and State Bonds.

(8) We recommend that the Procter Monument Fund, of which the A. Ph. A. is trustee, be continued on interest-drawing deposit with the International Bank of St. Louis.

J. H. BEAL,
THOS. P. COOK,
E. G. EBERLE,
H. M. WHELPLEY.

Committee.

Council Letter No. 9—Philadelphia, Pa., February 24, 1910.

Communication received from C. Lewis Diehl, Chairman of the Committee on National Formulary, reciting the methods of communication to the sub-committees and members of the Committee through the *Bulletin* and personal correspondence.

With the assistance of Mr. Wilbert, the circulation of correspondence with the members by means of mimeograph circulars, of which a sufficient number is to be mailed to the members of the Committee has recently been adopted. This circular, designated as "Bulletin of the Committee on National Formulary," is to be issued semi-monthly, and as much oftener as exigency requires.

The expense will be very light, and since it will not increase the cost very materially, if any, it is suggested therefore, that a preliminary appropriation of \$50.00 be made by the Council for preparing and issuing a Bulletin of the Committee on N. F., in mimeograph as above explained.

Such appropriation to be made from the fund accruing from the profits on the sale of the N. F.

Council Letter No. 10—Philadelphia, Pa., March 1, 1910.

Motion No. 31 (Permission to use parts of National Formulary in the "Modern Pharmacist" as per specimen formulas in abstract submitted) being still pending, a number of communications upon it were received, protesting against any use of such text as would interfere with the sale of the book.

No action has been taken on the program for the fifty-eighth annual meeting (1910) at Richmond, Va., submitted in Council Letter No. 5, and the General Secretary, the Local Secretary and the Secretary of the Council offer a revised program, as a substitute.

Motion No. 37—The program as modified will appear in the notice of the annual meeting.

Letter received from C. Lewis Diehl, Chairman of Committee on N. F., on resignation of Henry P. Hynson from the Committee on National Formulary.

Letter received from Francis B. Hays, Chairman of the Committee on Publicity of the American Pharmaceutical Association.

Associated Press representative at the Richmond meeting.

Motion No. 38 (Election of Members)—Applicants for membership Nos. 92 to 108 elected.

Council Letter No. 11—Philadelphia, Pa., March 10, 1910.

Motion No. 39—That the By-Laws of the Association relating to the number of sessions of the Section in Practical Pharmacy and Dispensing be suspended, and that the Section be permitted to hold a sufficient number of adjourned sessions to consider and discuss all the communications that may be presented.

The chief object of the motion being to obtain sufficient time to hold a "Symposium on the Pharmacopœias of the World" on Friday evening, May 6, 1910.

Motion No. 40—That Friday, May 6th, 9 a. m., be designated as the time for the reorganization of the Council, and that this information be inserted in the regular program for the Richmond meeting.

Motion No. 41—That the Council make an appropriation of \$50.00 to the Committee on N. F. for the expense of issuing bulletins to the members of the Committee.

Communication received from G. M. Beringer moving that the Council do not accept the resignation of Professor Henry P. Hynson as a member of the N. F. Committee.

Council Letter No. 12—Philadelphia, Pa., March 18, 1910.

Motions Nos. 35 and 36 (Council Letter Nos. 7, 18), 37 and 38 (Council Letter Nos. 10, 21 and 23), 39, 40 (Council Letter Nos. 11, 24), have all carried.

The vote on Motion No. 31 (Council Letter Nos. 6, 13) granting permission to use parts of the National Formulary for comment in "The Modern Pharmacist" has carried by a majority vote.

Communication received from Otto Raubenheimer on resignation of Professor Hynson as a member of the N. F. Committee.

Motion No. 42—That the Council do not accept the resignation of H. P. Hynson as a member of the Committee on National Formulary.

Motion No. 43—That the recommendations of the Committee on Invested and Trust Funds be adopted.

Motion No. 44—Applicants for membership Nos. 109 to 116 elected.

Council Letter No. 13—Philadelphia, Pa., March 31, 1910.

Motions Nos. 42, 43 and 44 have carried.

Communication presented from Chairman Godbold on resignation of H. M. Whelpley as a member of the Committee on the Reimbursement of George M. Beringer; also letter from H. M. Whelpley, resigning.

Motion No. 45—That the resignation of H. M. Whelpley as a member of the Committee on Reimbursement of George M. Beringer be accepted.

Motion No. 46—That the membership of the Committee on Reimbursement of George M. Beringer be increased from three to five in number, and that the Chairman of the Council be authorized to appoint three members on the committee to act with the remaining members.

Motion No. 47—That \$20.00 be appropriated to cover expense of certificates of membership on parchment.

Motion No. 48—Applicants for membership Nos. 117 to 129 elected.

Council Letter No. 14—Philadelphia, Pa., April 23, 1910.

Motion No. 41 has carried, the proposed expenditure having been approved by the Finance Committee.

Motions Nos. 45, 46, 47 and 48 have carried.

In accordance with Motion No. 46, Chairman Godbold has appointed the following as the three additional members on the Committee on Reimbursement of George M. Beringer: J. F. Beal, E. G. Eberle and J. L. Lemberger, to act with the two previous members, H. H. Rusby and M. I. Wilbert. The appointments have all been accepted.

Motion No. 49—That the General Secretary be instructed to have thirty gold badges made, and also forty gold bars, for the Richmond meeting.

Communication received from Henry Kraemer asking that Prof. Arthur Meyer, of Marburg University, be elected an honorary member of the American Pharmaceutical Association.

Motion No. 50—Applicants for membership Nos. 130 to 158 elected.

Mr. England next read the minutes of the third session of the Council, held at Richmond, on Tuesday morning, May 3, 1910.

MINUTES OF THE THIRD SESSION OF THE COUNCIL.

The third meeting of the Council for 1909-10 was held May 3, 1910, at 9 a. m., Chairman Godbold presiding. Present: Messrs. Godbold, C. Caspari, Jr., Eberle, Whelpley, C. E. Caspari, Asher, Johnson, Day, Lowe, Raubenheimer, Motter, Koch, England and Bowman. The minutes of the previous meeting were read and approved.

Applicants for membership Nos. 196 to 205, inclusive, were elected.

Charles Caspari, Jr., reported for the Committee on Publication on the subject of a Decennial Index.

Mr. Whelpley moved, seconded by Mr. Wilbert, that the next Decennial Index cover volumes 51 to 60, inclusive. Carried.

The Committee on Revision of Mailing List of the Proceedings reported progress.

The request of Henry Kraemer (contained in Council Letter No. 14) that Prof. Arthur Meyer, of Marburg University, be made an honorary member of the Association was, on motion of Mr. Wilbert, seconded by Mr. Rusby, agreed to, and Prof. Meyer was elected.

On motion of Charles Caspari, Jr., seconded by Mr. Motter, Prof. Alexander Tschirch, of Berne, Switzerland, was elected an honorary member of the Association.

Mr. Remington read a communication addressed to William H. Taft, President of the United States, inviting him in the name of the American Pharmaceutical Association, to be present at the opening of the U. S. Pharmacopoeial Convention, on May 10, 1910, at Washington, D. C. The sending of the communication was approved.

The annual report of the Secretary of the Council was presented and accepted. It was as follows:

To the Chairman and Members of the Council:

The Council of 1908-09 held six sessions in Los Angeles last year. The Council of 1909-10 held one session and an adjourned session, and has transacted business by mail since the Los Angeles meeting.

Fourteen Council Letters have been issued, covering 32 pages and conveying 50 motions.

The members elected during the year, to *date*, number 195, with no applicants rejected. This number is less than last year (379), but there have been only about six months since the Los Angeles meeting.

A synopsis of the minutes of the Council will be submitted, and become a part of the published records. The minutes have been published in the *Bulletin*.

The membership of the Council now numbers 35; of these 12 are members from branches.

Respectfully submitted,

J. W. ENGLAND.

Richmond, Va., May 2, 1910.

Motions Nos. 49 and 50 (contained in Council Letter No. 14) were reported as having passed.

Applicants for membership Nos. 159 to 195, inclusive, were elected.

Moved by Charles Caspari, Jr., that the Committee on Membership be requested to submit all names of applicants for membership to the respective state representative on the Committee for approval before sending the applications to the Secretary of the Committee on Membership for submission to the vote of Council, or if they be sent direct to the Secretary of the Committee on Membership they shall be sent by him, first, to the state representative, for approval. Seconded by Mr. Wilbert. Carried.

Moved by Mr. Whelpley, seconded by Mr. LaWall, that the above motion be made a General Rule and published in the Proceedings.

Moved by Mr. Whelpley, seconded by Mr. Koch, that the following resolution be made a General Rule: "The resignation of a member may be accepted during the first six months of the fiscal year for which his annual dues are payable."

Application was made by J. O. Burge, Nashville, Tenn., for permission to form a Nashville Branch of the A. Ph. A. Permission was granted on motion of Mr. Whelpley, seconded by Mr. Raubenheimer. Mr. Burge presented applications for membership from 21 new members, which together with 10 older members, makes the Nashville Branch number 31 members. The list is as follows:

List of members of Nashville Branch of A. Ph. A.:

E. A. Ruddiman,	Max Bloomstein,	Ernest John Schott,
J. T. McGill,	Lucius Polk Brown,	Frank Leslie Smith,
E. F. Trolinger,	Moses Cook,	Clarence Caery Young,
W. R. White,	Lucius Junius Desha,	Billie Calvin Wright,
Ira B. Clark,	Myer Ernest Hutton,	David Harold Zbinden,
R. L. Eves,	David Jacob Kuhn,	Wm. Marshall Blackman,
L. H. Holt, Jr.,	Andrew Joseph Martin,	W. Benson Rippetoe,
D. H. Nell,	James David McGinnis,	Jerome Bonaparte Sand,
J. O. Burge,	Stephen William Moore,	Harold Felix Zbinden.
George T. Wilson,	Luther Smith Pully,	
Kenley Glass Austin,	Roy Rascoe,	

On motion of Mr. Rusby, seconded by Mr. Hallberg, a rising vote of thanks was passed to Mr. Burge for his work in the formation of the Nashville Branch.

On motion of Mr. Hallberg, seconded by Mr. England, William R. White, who has been selected by the Nashville Branch to be Council member, was given the privileges of the floor.

Mr. Eberle reported progress for the Committee on Mexican Membership.

On motion of Mr. Koch, seconded by Mr. Hallberg, the committee was continued.

The Committee on Credentials was appointed by Chairman Godbold, consisting of Messrs. Koch, Johnson and Asher.

The report of the Committee on Publication was presented by Chairman Caspari, as follows:

REPORT OF COMMITTEE ON PUBLICATION.

Your Committee on Publication beg leave to report that the "Proceedings" of the fifty-seventh annual meeting have been published, and a copy of the same delivered in March of the present year, and since that time to every member entitled thereto, according to the Treasurer's accounts, besides the usual number (about 100) of complimentary copies to the honorary members, state libraries, the pharmaceutical press, educational institutions and foreign bodies. Of the total number of books (2,400) printed, 350 copies remain on hand in flat sheets, 2,000 having been bound in cloth and 50 in paper. It was also found necessary during the year to bind in cloth 75 copies of the 1907 volume and 150 copies of the 1908 volume of Proceedings, the stock having become exhausted and demand arising for the same. The cost of publication and delivery for the nine months, July, 1909, to May, 1910, is shown by the following items:

Composition, paper and press work (2,400 copies)	\$2,875 01	
Binding 2,000 copies in cloth (1909) at 27 $\frac{3}{4}$ c.....	\$555 00	
Binding 150 copies in cloth (1908) at 23 c.	34 50	
Binding 75 copies in cloth (1907) at 23 c.	17 25	
Binding 50 copies in paper (1909) at 8 c.....	4 00	
		610 75
Expressage and postage		684 90
Illustrations		57 45
Journals for the Reporter (foreign)		26 36
Special sets of roll and list of members		10 00
Salary of the stenographers		305 00
Salary of the Reporter on the Progress of Pharmacy		625 00
Electrotyping 41 pages and changing of plates.....		67 07
		<hr/>
		\$5,260 54

For the Committee, CHAS. CASPARI, JR., *Chairman*.

Baltimore, May 2, 1910.

The report was accepted.

General Secretary Caspari reported an opinion by Gans & Haman, of Baltimore, on the legal liability of the Association, if any, should it reimburse G. M. Beringer for the expense of the suit against him by the "Farbenfabriken" of Elberfeld Company. The opinion reads as follows:

The American Pharmaceutical Association:

At the request of your Secretary, Charles Caspari, we have given consideration to the question whether, if your society reimburses George M. Beringer, of Camden, N. J., in whole or in part for the expenses incurred by him in the suit against him by the "Farbenfabriken" of Elberfeld Company, it will thereby render itself liable to a suit by the "Farbenfabriken" Company. The suit referred to was for libel and slander by the "Farbenfabriken" Company against Mr. Beringer, based on the reading by him before the Association at its fifty-third annual meeting held in September, 1905, of a paper entitled "Why the Mann Bill should be Enacted," followed by a publication of the paper in the volume entitled, "Proceedings of the American Pharmaceutical Association, 1905, Volume 53." We have read the article referred to and also the opinion of the United States Circuit Court of Appeals for the Third Circuit, which affirmed a judgment of the Circuit Court of the United States for the District of New Jersey in favor of Mr. Beringer.

The opinion is reported in Volume 158, "Federal Reporter," page 802. We have also read the certificate of incorporation of your Association, and note its corporative purposes. We further understand that it is an Association not organized for profit and not conducting any profitable business, having no capital stock and having a revenue derived principally from dues paid by members.

As a result of our consideration of the matter we are quite clearly of the opinion that your company will not incur any liability to the "Farbenfabriken" Company by making the payment proposed. The entirely sufficient reason for this opinion is that the contribution you are asked to make is for the defense of a suit by Mr. Beringer in which it was finally determined that the plaintiffs had no cause of action against him, because the publication referred to did not constitute a libel upon the plaintiff. The result of the case, to the expense of which you may possibly decide to contribute, was a judicial determination that there was no libel committed against the plaintiff. By making the contribution a non-libelous article could not be converted into a libelous one.

Even if the article could be considered a libel upon the "Farbenfabriken" Company, still we do not think that the contribution you are asked to make would make your Association any more liable to the "Farbenfabriken" Company than it now is by reason of the publication of the paper among your proceedings. The paper was prepared by Mr. Beringer at the request of your Association, and published in due course among the proceedings. According to the practice of your body, we understand that papers when read before the Association can either be repudiated or vetoed, or allowed to take their usual course, which means, as we understand, their publication. In this case we understand the paper was allowed to take its usual course and published. If the article had been libelous, as a matter of law your Association would have been civilly liable by the reason of its publication. The payment of Mr. Beringer's expenses would have no importance with regard to determining the question of your liability, except by way of a ratification by your Association of his statements.

This, however, is not an important consideration in the present case, where you have already adopted his statement by publishing the same among your proceedings. We do not mean by this expression that your body is necessarily committed to the views expressed by Mr. Beringer in his paper, but it is a familiar rule of the law of libel, that one who spreads a slanderous or libelous publication is civilly liable, even though he does not originate it. In this case, therefore, if the article had been libelous, its publication by your Association would have established your responsibility, which would not be legally increased by making the payment to Mr. Beringer, except in so far as this might be an additional consideration for a jury in estimating the damages.

We appreciate that it is possible that the "Farbenfabriken" Company might still proceed against your Association for the publication of this paper, and contend that the decision in its suit against Mr. Beringer would not be conclusive in its suit against the Society, because the proceedings are between different parties, and for that reason the first case would not constitute an absolute legal bar to the prosecution of the second. But if such a suit were brought it would have to be based upon the publication of the article by you in the first place, and not upon your contribution to Mr. Beringer's expenses.

In our examination of the question submitted by Dr. Caspari, we have given consideration to one or two other matters which may be of interest to you, although they are not necessarily involved in the decision of the particular question.

The points that we have in mind are, whether your Association is civilly liable at all for the publication of any paper which may be read before it, provided the publication is made in good faith and without malice. There is some authority in favor of the proposition that such a publication is of a privileged character, but we do not think that the cases have been sufficiently numerous to be decisive on this point. Another question that we had in mind was whether an Association such as yours can be made civilly liable at all in an action for a wrong.

There is a well-known doctrine of the law that charitable associations, such for instance as hospitals, cannot be successfully sued at all for torts. The reasoning in support of some of the decisions to this effect is perhaps broad enough to include in this exemption many other classes of organizations which are not organized or conducted for profit. The extent of the application of the doctrine is, however, uncertain. It has been applied in Maryland to the House of Refuge, to a county school board and on several occasions in the city courts to the Johns Hopkins Hospital. We are not able to say that this doctrine of exemption from liability could successfully be invoked by your Association, although the question will be an interesting one of law if it should arise. It is, perhaps, of not much practical importance to you in view of the fact that if the Association were not civilly liable for a publication such as we mention, doubtless the officers of the Association who participated in the publication would be personally liable.

At the request of your Secretary, we are enclosing our bill for services in this matter.

Yours very truly,

GANS & HAMAN.

Baltimore, November 13, 1909.

On motion of Mr. Eberle, seconded by Mr. Whelpley, the report was accepted.

Treasurer Whelpley reported that he had prepared a statement as Treasurer for the period to April 1, 1910. He would prepare, later, a report to the end of the fiscal year, June 30, 1910.

On motion of Mr. England, seconded by Mr. Koch, the Auditing Committee was directed to audit the Treasurer's report for the fiscal year to June 30, 1910.

Treasurer Whelpley made an explanation with reference to a bill of H. D. Knisely for \$32.40 for Committee expenses. The bill was approved by the Committee on Finance, and ordered paid.

Mr. Rusby, seconded by Mr. Meissner, moved that whenever an appropriation was made by the Council, the Secretary of the Council should notify the parties who were to expend the appropriation, as well as the Chairman of the Committee on Finance.

Moved by Mr. LaWall, seconded by Mr. Whelpley, that the above resolution be made a General Rule and published in the "Proceedings."

Communication was received from Dr. V. E. Wiechmann, of Lawrence, Mass., asking for permission to publish the National Formulary in the Italian language.

On motion of Mr. Hallberg, seconded by Mr. England, the request was referred to the Committee on National Formulary to report back to the Council.

Chairman Meissner, of the Committee on Finance, suggested that before bills are sent to the Committee on Finance they should be first approved by the party contracting them, and marked by the name of the items to which they should be charged.

Editor Hallberg presented the report on the "Bulletin," as follows:

REPORT ON THE BULLETIN BY THE EDITOR.

Expenditure monthly from September, 1909, to May, 1910, inclusive:

September, 1909, 48 pp.	\$197 26	Printing, binding, mailing.....	\$1,460 75
October, 1909, 64 pp.	199 67	Envelopes with card	61 75
November, 1909, 64 pp.	188 86	Auto addressing	27 81
December, 1909, 48 pp.	161 97	P. O. charge	54 09
January, 1910, 64 pp.	193 33	Postage, city, foreign, etc.....	73 10
February, 1910, 64 pp.	191 42	Porterage.....	11 00
March, 1910, 64 pp.....	223 01		
April, 1910, 64 pp.....	179 70		
May, 1910, 64 pp.	190 28		
	<hr/>		
	\$1,725 50	Salary stenographer, August, September, 1909.....	20 00
		Expressage Bulletins to Rich- mond	1 00
		Add P. O. deposit	5 00
		Reprints for Pres. Rusby.....	11 00
			<hr/>
			\$1,725 50

The Council voted at the last annual meeting that the "Bulletin" may be increased from 32 to 48 pages, as required, to more completely report the Branch meetings and other Association activities, and appropriated \$2,000 to defray such expenses for the year, including the \$200 salary of the editor.

The September "Bulletin" consisted of 48 pages, devoted chiefly to a report and review of the annual meeting. The publication of the Report of the Committee on the National Formulary required an increase to 64 pages for the October "Bulletin," as did the report of the Committee on the U. S. Pharmacopoeia also require 64 pages for the November "Bulletin;" the December "Bulletin" was 48 pages.

The publication of these reports having consumed considerable space required that most of the "Bulletins" after the first of the year would have to be kept within the original limit of 32 pages, so as not to exceed the average of \$150 per month appropriated. Since this would have been a sore disappointment in that the program of devoting more pages to the Branch reports would have to be largely abandoned, the Committee on the Bulletin asked the Council to permit as much of the appropriation for the year to apply to the nine months, intervening the annual meetings this year, which the Council promptly granted. The result was the increased monthly allowance of \$200 instead of \$150, sufficient to defray the expenses of a 64-page "Bulletin" for the five months remaining to this meeting.

As will be seen the expenditures for these nine months amounts to \$1,725.50, averaging little less than \$200 per month, owing to the fact that two "Bulletins" contained 48 pages. The editor's salary adds \$124 for the period of nine months, thus making a total of \$1,850, leaving a balance of \$150 within the limit of the appropriation.

The "Bulletin," particularly during the past five months, has tried to give the fullest reports of the Branch meetings, and when possible also has published many papers read at those meetings. It has also endeavored to present such reports, resolutions, etc., from the annual proceedings as would be desirable for reference to members actively engaged in Association work without awaiting their publication in the annual volume.

It is believed that this feature is appreciated and should be continued and extended.

The work of the Association will always be hampered and delayed unless those interested are furnished promptly with complete information on the many subjects considered at the annual meetings in order that they may continue the work intelligently and promptly.

There are a great many other features which suggest the advantages of an extended and enlarged "Bulletin."

This, however, is a subject which the Committee on the "Bulletin" will no doubt bring to your attention.

The editor has endeavored as far as his time permits to make the "Bulletin" useful to the Association, and has made the May "Bulletin" a complete program for the annual meeting, as well as our affiliated Associations, the Conference of Faculties, the National Association of Pharmacy Boards and the United States Pharmacopoeial Convention.

In the hope that his efforts may have been of service in creating more interest in the Association and in its work and increasing the membership, this report is respectfully submitted.

C. S. N. HALLBERG, *The Editor.*

Chicago, April 30, 1910.

The resolution of Mr. Whelpley, passed at the meeting of the Council on May 2 relating to the resignation of members within six months after election, was referred to a special committee consisting of the Treasurer, the Secretary of Council and the General Secretary to prepare an amendment to Article VII, Chapter VIII, covering the resolution.

On motion, L. E. Sayre was given the privilege of the floor and presented the following communication from Albert Schneider for the Committee on Drug Reform :

RESOLUTIONS ON DRUG REFORM.

WHEREAS, The national and the several states' pure drug laws have placed upon the pharmacists of the United States greater obligations regarding the supplying of drugs of standard quality, and

Whereas, The quality of the more important vegetable drugs now on the market is very inferior, and

Whereas, Adulteration of crude as well as powdered vegetable drugs is practiced to an alarming degree, and

Whereas, The vegetable drugs intended for percolation are not reduced to a suitable or uniform fineness, and

Whereas, The United States Pharmacopœia is the legally recognized standard of the quality and purity of drugs, be it therefore

Resolved, That the following recommendations be submitted to the Council and General Assembly of the American Pharmaceutical Association for approval, and be it further

Resolved, That upon approval by the A. Ph. A. the recommendations be submitted to the Revision Committee of the United States Pharmacopœia, with the request that immediate steps be taken by that body to carry out the suggestions embodied in the recommendations.

I. Fineness of Powders and Mesh of Sieves.

The U. S. P. should give the required fineness of vegetable powders, specifying the diameter of the mesh of the sieve to be used. In giving the diameter of the sieve mesh the material used should not be included, that is, the measurements should give the diameter of the free opening only. Powdered vegetable drugs of which the fineness is not in accord with the pharmacopœial requirements should be declared not up to standard.

II. Age Limit of Vegetable Drugs.

Wherever possible the U. S. P. should state the age limit of vegetable drugs for crude as well as for those that are powdered. The U. S. P. should further give a table of corrections for variation in the activity of vegetable drugs, due to aging within the stated limit.

III. Diagnostic Microscopical Characteristics of Vegetable Drugs.

Every vegetable drug included in the U. S. P. should have a brief diagnostic description based upon its microscopical appearances, as per the following examples :

Under Rio ipecac should be given : "Starch granules simple to compound, simple granules not exceeding 13 in diameter : hili centric; polarizing phenomena not marked, acicular crystals and tracheids present. Ducts, base and sclerenchyma cells should be wholly absent."

Or under belladonna root : "Starch granules simple to compound, hili distinct more or less eccentric; simple granules from 6 to 17, polarizing phenomena marked, in direct ratio to size of granules. No acicular crystals, sclerenchyma cells or spiral ducts present."

IV. Maximum Percentages of Impurities in Vegetable Drugs.

The U. S. P. should state the maximum amount of impurities permissible in vegetable drugs. For this purpose the vegetable drugs should be classed as follows :

Class A. Only a trace (1 per cent. or less) of impurities permissible, as ergot, kamala and lycopodium.

Class B. Impurities to not exceed 2 per cent., as most seeds, some fruits, ipecac, many barks, etc.

Class C. Impurities not to exceed 5 per cent., as some barks, some leaves, stems, flowers, flowering tops, etc.

Class D. Impurities not to exceed 10 per cent., as some roots, rhizomes, some barks, etc. Any vegetable drug with more than 10 per cent. of impurities (as sand, pebbles, dirt, foreign tissues, etc.) should be rejected as being below standard.

Respectfully submitted,

ALBERT SCHNEIDER.

Richmond, Va., 1910.

On motion of C. Caspari, Jr., seconded by Mr. Wilbert, the communication was referred to the Committee on U. S. Pharmacopoeia.

On motion of Mr. Whelpley, seconded by Mr. Wilbert, the Committee on Publication was directed to insert the pictures of P. C. Candidus and W. M. Searby in the 1911 Proceedings.

Adjourned to meet Wednesday, May 4, 1910, at 9 a. m.

J. W. ENGLAND, *Secretary.*

In answer to a question by Mr. H. P. Hynson as to the General Index, the General Secretary stated that the Association had on hand a stock of both bound and unbound copies—that it had quite a large number of unbound copies. Responding to further inquiry by Mr. Hynson, he stated that the Decennial Index would be printed in connection with the volume of Proceedings for that year, as had been the case in the past, and he did not think the suggestion made by Mr. Hynson that the Decennial Index be bound in with the unbound sheets of the Semi-Centennial Index was practicable, as it would involve an extra expense to members buying the Semi-Centennial Index, unless the Association desired to present a copy of the Decennial Index to members. Mr. Hynson said that his idea in making the suggestion was, that it would add very materially to the value of the Semi-Centennial Index, and it would save time and would cost very little, and he believed the Association could well afford to do that. He thought it would be well to refer the matter to the Council for consideration, and he so moved. Responding to a suggestion by Mr. C. E. Caspari, of St. Louis, that a great many of the members had already received copies of the General Index, and that provision should be made for the publication of the Decennial Index in the Proceedings also, Mr. Hynson replied that he had no desire to interfere with the publication of the Proceedings in any way. The Chair stated that without objection this matter would be referred to the Council for further consideration, and it was so ordered.

Secretary England read the minutes of the fourth session of the Council, held Wednesday, May 4, 1910:

MINUTES OF THE FOURTH SESSION OF THE COUNCIL.

The fourth meeting of the Council was held May 4, 1910, at 9:30 a. m., Chairman Godbold presiding. Present: Messrs. Godbold, England, Lowe, Hunsberger, Raubenheimer, Day, Johnson, Eliel, C. Caspari, Jr., Rusby, Koch, Motter, Whelpley, Wilbert, Eberle, Bowman, Asher, White, Beringer, Hallberg and Meissner, C. E. Caspari.

The minutes of the previous meeting were read and approved.

The communication from Dr. V. E. Wiechmann, referred by the Council to the Committee on National Formulary, was referred back to the Council by the latter as having no power to grant the permission asked.

Moved by Mr. Caspari, seconded by Mr. Wilbert, that the Secretary of the Council write Dr. Wiechmann that the Council, at the present time, is not in a position to authorize the translation, and request fuller information as to the nature and extent of the translation to be made.

Moved by Mr. Wilbert, seconded by Mr. Lowe, that the Secretary of the Council write to the Chief of the Copyright Division, Library of Congress, asking for full information regarding international copyright laws, and the rights and privileges of American citizens and corporations under the same.

On motion of Mr. Whelpley, seconded by Mr. Lowe, it was decided to amend the by-laws so that the Board of Canvassers shall count as votes, in the annual election, only the votes of those members whose dues have been paid up for the current year.

Moved by Mr. Beringer, seconded by Mr. Lowe, that permission be granted Local Secretary Miller to post cards announcing an exhibit by the American Druggists Syndicate. This was not agreed to.

Applicants for membership Nos. 206 and 207 were elected.

J. W. ENGLAND, *Secretary*.

The Chair directed attention to the fact that the work of the Council during the whole year had been of very great importance, and ought to be of great interest to the Association. He said the Association was to be congratulated upon having another Branch at Nashville, and that the indications were that it would be a strong one. This Branch, he said, had been established largely through the efforts of Mr. Burge, of that city, who had come before the Council with the names of 21 new members from Nashville, and has since added two more. He said he was sure the Association wished the new Branch the greatest success.

On motion of Mr. Hynson, seconded by Mr. Eliel, of Indiana, the minutes of the Council were then approved as read.

The Chair here called for action upon the proposed amendments to the By-Laws submitted at yesterday's session. He said he gave this matter precedence at this time because certain other work to be done by one of the Branches of the Association could not be approved until this amendment of the By-Laws was adopted.

The Secretary read the first proposed amendment, to Article I of Chapter X of the By-Laws, proposed by Mr. Beal at the first session, to change the word "ten" in the first line to "eleven," and to insert after the sixth word in line 3 (members) the words "a Committee on Pharmaceutical Syllabus of seven members;" the effect of the amendment being to make an additional Standing Committee, as indicated.

Mr. W. L. Scoville, of Detroit, wanted to know why a Syllabus Committee was considered necessary, and what its work was to be. President Rusby thereupon made the following explanation:

The Pharmaceutical Syllabus consists of a syllabus of instructions which it is considered as appropriate that schools of pharmacy should adopt;

and it is also hoped that not only will this become the basis for pharmaceutical instruction, but that it shall become the basis of examination by the Boards of Pharmacy. It is, in short, an attempt to promote harmonious action between those giving instruction in the colleges and those who are to determine the fitness of candidates for license because they have had that instruction. There is nothing binding about it, but something to indicate the ideas of this Association as to what pharmaceutical instruction and examination should be. The Syllabus has already been published. We have done this, not under the sanction of a standing committee, but through our Section on Education and Legislation, in combination with the Conference of Pharmaceutical Faculties and the Association of Boards of Pharmacy. We have been working on this for two years past. That Syllabus has now been published, as I say; but it is a tentative Syllabus—a beginning, a foundation. It is probable there are weaknesses in it which we will want to change, and it is indeed expected that all the Boards of Pharmacy and all the Colleges of Pharmacy will take that Syllabus and send in their ideas as to changes that should be made in it, so that at the end of five years we may republish that Syllabus in revised form, so as to thoroughly represent the ideas of the Boards of Pharmacy and Colleges of Pharmacy. We could do this without action by this Association, but there is some small expense attached to it, some \$10 or \$15 a year for each of the three branches of the Association; and, as you know, it is impossible for a Section of the Association to appropriate money, except by consent of the Association in general session.

Further answering an inquiry by Mr. Scoville, the President stated that this proposed Committee on Pharmaceutical Syllabus would take the place of the Committee which had gotten out the present Syllabus, and this matter would hereafter be the action of the Association—would express the views of the Association, instead of one of its Sections.

Thereupon the Chair put the vote upon the motion to amend Article I, Chapter X of the By-Laws in the way indicated, and it was carried.

The Secretary read the next proposed amendment of the By-Laws as offered by Mr. Beal, to add to Chapter X, Article XII, as follows:

Article XII—The Committee on Pharmaceutical Syllabus shall be appointed by the President of the Association as follows: One member shall be appointed for seven years and one for six, five, four, three, two and one years respectively; each vacancy occurring from expiration of term shall be filled for a term of seven years: other vacancies shall be filled at the annual meetings of the Association for the unexpired term. This Committee shall report to the Association through the Section on Pharmaceutical Education and Legislation, shall be members of the National Committee on Pharmaceutical Syllabus and shall recommend to the Association its proportionate share of the current expenses.

On motion of Mr. F. W. Meissner, of La Porte, Ind., duly seconded, this proposed amendment to the By-Laws was also adopted.

The Secretary gave notice of a proposed amendment of Article III, Chapter III, of the By-Laws, made necessary by some amendments to the By-Laws last year. His motion was to eliminate the last sentence in Article III, referring to the General Secretary—"He shall notify every member at least two weeks in advance of the time and place of each annual meeting;" and to insert in lieu thereof the sentence "He shall publish in the *Bulletin* a notice of the time and place of next meeting at least four weeks prior to the date of the next meeting." The Chair stated that this would be acted on at the next session.

Mr. Hynson, of Baltimore, said he also wanted to offer a proposition to amend the By-Laws. He said that the Commercial Section of this Association was either a benefit or a detriment to the Association; that it had been presided over since the days of the "immortal Jacobs," of Atlanta, by Messrs. Rapelye, Hopp, Anderson, Mason and others, including himself, and all of these had worked zealously to make something out of that Section, but without much result to show for it. His proposition was, therefore, to change the name of the Section from that on Commercial Interests, to the Section on Ethics and Practice, and his motion would be open for discussion at the next session.

The Chair called on the Secretary to read the proposed amendment, which he did as follows:

PROPOSITION TO AMEND BY-LAWS.

Chapter IX, Article II, line 3. Strike out the words "Commercial Interests" and insert the words "Ethics and Practice" in their places.

Article V, line 1. Strike out words "Commercial Interests" and insert the words "Ethics and Practice" in their places.

Chapter X, Article I, line 4. Strike out the words "Commercial Interests" and insert the words "Ethics and Practice" in their places.

Article II, line 1. Strike out the words "Commercial Interests" and insert "Ethics and Practice" in their places.

H. P. HYNSON.

The Chair asked if there were any other proposed amendments to the By-laws, but none were offered.

The Secretary said he would like here to call attention to two short communications which he thought the Association would be glad to hear. He said the General Secretary had been instructed at yesterday morning's session to send telegrams of fraternal greeting to the former Treasurer of this Association, Mr. Samuel A. D. Sheppard, of Boston, now at Pinehurst, North Carolina, on account of his health. He had received reply by wire from him, which he would like to read:

PINEHURST, N. C., May 4, 1910.

To American Pharmaceutical Association:

Warmest thanks for kind remembrance; only hard necessity keeps us from the meeting. May you do your usual good work, and thus keep true pharmacy in the front rank.

S. A. D. SHEPPARD.

The Secretary said the next communication was from an honored ex-President, Mr. William Saunders, of Ottawa, Canada, and he would read his letter, omitting the personal parts of it :

DOMINION OF CANADA.
Department of Agriculture. }
OTTAWA, ONT., March 7th, 1910.

THOS. F. MAIN ESQ., 164 Chambers St. New York, N. Y.

Dear Friend; I thank you for your very kind letter of March 3rd which is just received. The work I have been doing for twenty-five years past has been most interesting and one which has given me a great deal of enjoyment in carrying out. It is very gratifying to have so many friendly compliments passed on one's work and I value such kind expressions very fully when they come from my old pharmaceutical friends.

I should like very much to be present at the meeting in Richmond, Va., in May, but it would be quite impracticable, as I am starting a new Experimental Farm at Charlottetown in Prince Edward Island, and will necessarily have to be there about that time, and from that point I shall go off to do similar work in Saskatchewan. I hope you will be good enough to remember me kindly to any of my friends who may ask for me, and express my regrets that I shall be unable to be present in person.

With kind regards, yours very truly,

WM. SAUNDERS.

Mr. Thomas F. Main, of New York, moved that the Secretary send a telegram of fraternal greeting to Mr. Saunders, and also the hearty congratulations of the Association on the magnificent work Mr. Saunders was doing in the establishment and extension of what is known as "experimental farming" in the Dominion of Canada.

Mr. John F. Hancock, of Baltimore, also paid tribute to Mr. Saunders as a man of ability, and said he had done a great service for Canada—as one of the recent journals had put it, "he has been of more use than all the politicians of Canada to that Province." He said he was a man worthy of the highest regard by the members of this Association, and he took pleasure in seconding the motion of Mr. Main.

Mr. F. E. Stewart, of Philadelphia, moved to amend by sending a written communication instead of a telegram, so that the Association might express itself a little more fully. Mr. F. M. Apple, of Philadelphia, suggested a "night letter" by wire.

Mr. Main paid further tribute to the valuable work Mr. Saunders was doing, and said that if any of the various members visited Ottawa at any time, he would advise them by all means to go to the "Experimental Farm" there, whether Mr. Saunders was present or not, and let it be known they were members of the American Pharmaceutical Association, and he said they would be heartily received and conducted over the grounds. Mr. Saunders, he said, had established these farms all over the Dominion of Canada, as he understood, and he would earnestly advise any of the members who happened to be in the vicinity of one of these farms not to miss the opportunity to visit it.

The Chair then put the motion to send the greetings and congratulations of the Association to Mr. Saunders by letter, and it was carried.

The next report called for was that of the Treasurer of the Association, Mr. H. M. Whelpley, of St. Louis.

Mr. Whelpley said that perhaps as the members had observed by the reading of the minutes of the Council, the annual report of the Treasurer would not be complete until the end of this fiscal year, June 30, 1910. He said he had prepared a summary of the financial condition of the treasury, but even this was likely to be misleading, on account of the relation between the receipts and expenses not corresponding with each other when taken for the first eight months of the year. There were, however, other things about the Treasurer's work which could be stated with more accuracy, especially as to the invested funds of the Association, which increased little by little, month by month, and concerning which a statement might be made at any time during the year.

Mr. Whelpley stated that one matter which was of particular importance was that of the collection of dues. Two years ago there were members carried on the books who were in arrears of dues as much as five years, and quite a number owed for four years, while there were many delinquents for three years. At the present time, however, the Association had no members who owed for more than two years. At the annual meeting in Los Angeles last year he read a list of those who were to be dropped for non-payment of dues, and the reading of that list had saved quite a number of these members to the Association, because of the interest taken by certain persons present to see that the delinquent members did not permit their names to be dropped from the rolls. The list of those delinquent for two years was now 146, and Mr. Whelpley said he was particularly anxious to find members present who would co-operate with him in an effort to save as many as possible of these to the Association, and avoid the necessity of the publication of their names in the volume of Proceedings as having been dropped for non-payment of dues.

After the reading of this list, and the eliciting of various responses and inquiries by members, Treasurer Whelpley said that he had, in his efforts to collect these dues, mailed fourteen different communications to those whose names had been given—eight of them bills and six of them letters.

Mr. Hynson noted the fact that a number of members of the various Boards of Pharmacy on this list were delinquents, and suggested that they, at least, should see to it that their names should not appear in the printed list of those dropped.

Treasurer Whelpley next took up in abstract a statement of the invested funds of the Association, and pointed out how they had grown in the past year. For instance, the Life Membership Fund, the largest fund of the Association, had increased from \$16,629.90 on July 1, 1909, to \$17,141.68 at this date. The Endowment Fund had increased from \$3,634.35 to \$4,934.70, the largest item of which increase was the munificent gift of Mr. Charles E. Dohme, of Baltimore, of \$1,000, just before the Los

Angeles meeting. Mr. Whelpley also showed \$2,822.90 in a new fund known as the "Ebert Legacy," the Ebert Fund proper standing at \$938.36, and that the Centennial Fund had increased from \$2,329.67 to \$2,386.25; the total amount of the invested funds to date, as shown, being \$28,223.89. These figures are comprised in and are a part of the detailed report of the Treasurer as of July 1, 1910, appearing a little further on.

Mr. Murray Galt Motter, of Washington City, arose to a point of personal privilege, and asked that his name be not used in connection with the fund held in trust for the National College of Pharmacy, referred to in the Treasurer's report, which fund was given with the distinct understanding, he said, that his name was not to be attached to it. He said the reason he had not made this motion at the Los Angeles meeting was because he was not present and could not do so. The Treasurer responded that the name had been used as found upon the books of the former Treasurer that had come to him, and suggested that it would take formal action of the Council to justify a change in the record. He said he would be glad to accede to the request, if properly authorized. Thereupon Mr. W. L. Cliffe, of Philadelphia, moved that Mr. Motter's request be referred to the Council for action, and this motion was seconded by Mr. Godbold, of New Orleans, and carried.

Mr. C. S. N. Hallberg, of Chicago, expressed the opinion that only individual names should be appended to the contributions to such funds, and called attention to the fact that a name was attached to a contribution of \$10 to one of these funds, which, in his opinion, was in conflict with the Constitution of the Association. He moved, therefore, that the Treasurer be instructed to either return the money or credit it to an individual, and not to an anonymous chemical corporation. The Treasurer explained that this was a fund that the Association held in trust, and that the money came to the Treasurer of the Association from the treasurer of the Committee on the Procter Monument Fund, and that perhaps all he could do was to make the entry of the remittance as it came to him, and he suggested that the motion be modified in such a way as that it might be directed to the Committee, rather than to the treasurer. The Chair held, however, that this motion was out of order at this time, and would properly come up when the report of the Committee on the Procter Monument Fund was brought up for consideration.

Thereupon, upon the motion of Mr. L. E. Sayre, of Kansas, seconded by Mr. Philip Asher, of New Orleans, the report of the Treasurer as made was received.

The Treasurer's completed report, as of July 1, 1910, here follows:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1909, TO JULY 1, 1910.

RECEIPTS.

Cash on hand July 1, 1909.....		\$7,749 69
Cash received from dues 1907.....	\$240 00	
“ “ “ “ 1908.....	575 00	
“ “ “ “ 1909.....	5,300 00	
“ “ “ “ 1910.....	3,705 00	
“ “ “ “ 1911.....	5 00	
	<hr/>	\$9,825 00
“ “ “ sale of 16 certificates @ \$3.00	48 00	
“ “ “ “ “ 14 certificates @ \$5.00 (\$1.00 paid for postage)	71 00	
“ “ “ “ “ Proceedings.....	43 05	
“ “ “ “ “ Badges and Bars.....	141 30	
“ “ “ “ “ National Formulary.....	4,154 91	
“ “ “ “ “ Semi Centennial Index.....	4 18	
“ “ “ interest of Bonds	300 00	
“ “ “ interest—Deposit International Bank of St. Louis	201 40	
Bank Exchange	1 81	
	<hr/>	\$14,790 00
Ebert Legacy Fund	\$2,800 00	
Ebert Prize Fund	60 00	
Procter Monument Fund	278 75	
Centennial Fund	30 00	
Life Membership Fund	540 00	
Endowment Fund.....	1,248 50	
	<hr/>	4,957 25
Total		\$27,497 59

DISBURSEMENTS.

July	15.	Check 1565. Security Storage and Trust Co., Miscellaneous Expenses.....	\$10 00
	15.	Check 1566. John S. Bridges & Co., Printing and Stationery	16 85
	15.	Check 1567. J. W. England, Miscellaneous Expenses	9 26
	15.	Check 1568. Nixon-Jones Printing Co., Printing and Stationery	12 20
	15.	Check 1569. C. S. N. Hallberg, Membership Campaign ..	99 65
	15.	Check 1570. Harmegrimmes & Howell, Miscellaneous Expenses	6 00
	15.	Check 1571. A. H. Fetting, Badges and Bars	28 00
August	20.	Check 1572. C. S. N. Hallberg, Bulletin.....	98 71
	22.	Check 1573. C. S. N. Hallberg, Bulletin.....	92 72
September	21.	Check 1574. William Mittelbach, Miscellaneous Expenses.	16 00
	21.	Check 1575. H. M. Whelpley, Miscellaneous Expenses ..	12 60
	21.	Check 1576. J. W. England, Printing and Stationery	10 76
	21.	Check 1577. C. L. Diehl, National Formulary.....	82 24
	22.	Check 1578. George M. Beringer, Committee on Unofficial Standards.....	36 45

October	9.	Check 1579. George M. Beringer, Committee on Un- official Standards.....	\$34 30
	9.	Check 1580. C. S. N. Hallberg, Bulletin	197 26
	9.	Check 1581. Security Storage and Trust Co., Miscellaneous Expenses	10 00
	9.	Check 1582. E. F. Greathead, Committee on Membership.	5 75
	9.	Check 1583. John S. Bridges & Co.— Miscellaneous Expenses	\$86 00
		Printing and Stationery	7 75
			<hr/> 93 75
	9.	Check 1584. Alpha Photo-Engraving Co., Proceedings...	40 60
	9.	Check 1585. E. J. Richardson & Sons, Insurance.....	21 60
	9.	Check 1586. F. T. Bannon, National Formulary	3 00
	9.	Check 1587. Wickersham Printing Co.— National Formulary	\$370 33
		Miscellaneous Expenses	60 13
		Proceedings	28 75
			<hr/> 459 21
	9.	Check 1588. Nixon-Jones Printing Co., Printing and Sta- tionery	35 40
	9.	Check 1589. Charles Caspari, Jr., Traveling Expenses....	202 15
	9.	Check 1590. Procter Monument Fund, Interest put in by mistake	25
	16.	Check 1591. H. M. Whelpley, Traveling Expenses.....	154 00
	16.	Check 1592. H. M. Whelpley, Miscellaneous Expenses...	60 00
	16.	Check 1593. E. H. Greathead, Printing and Stationery...	21 40
	16.	Check 1594. Nixon-Jones Printing Co., Printing and Sta- tionery	12 45
	16.	Check 1595. J. W. England, Traveling Expenses.....	150 00
	16.	Check 1596. Henry Kraemer, Ebert Prize.....	30 00
	16.	Check 1597. G. I. Sutherland, Stenographer.....	3 50
	16.	Check 1598. Eva Francis, Stenographer.....	1 50
	16.	Check 1599. H. M. Whelpley, Miscellaneous Expenses ..	7 90
	16.	Check 1600. Nixon-Jones Printing Co., Printing and Sta- tionery	24 00
	16.	Check 1601. C. S. N. Hallberg, Bulletin.....	199 67
	16.	Check 1602. John S. Bridges & Co. Section on Commercial Interests.....	\$3 72
		Section on Historical Pharmacy	3 26
		Section on Scientific Papers.....	3 72
		Section on Education and Legislation.....	3 98
		Section on Practical Pharmacy	3 98
			<hr/> 18 66
	26.	Check 1603. Wm. B. Day, Committee on Membership...	13 00
	26.	Check 1604. John Brown, Certificates.....	10 00
	26.	Check 1605. John S. Bridges & Co., Printing and Sta- tionery	12 00
November	9.	Check 1606. Wm. B. Day, Membership Campaign	56 00
	9.	Check 1607. Security Storage and Trust Co., Miscellan- eous Expenses	10 00
	9.	Check 1608. Nixon-Jones Printing Co., Printing and Sta- tionery	7 80

November	9.	Check 1609. A. G. Edwards & Sons, Bonds—St. Louis 4's at 101½ (\$5,075.00), 134 days' Interest (\$74.44).....	\$5,149 44
	18.	Check 1610. J. S. Bridges & Co., Printing and Stationery.	3 00
	18.	Check 1611. Wickersham Printing Co.— National Formulary	\$215 72
		Proceedings	21 00
			236 72
	18.	Check 1612. Wm. B. Day, Membership Campaign	75 38
	18.	Check 1613. J. G. McLean, Stenographer.....	300 00
	18.	Check 1614. E. F. Greathead, Membership Committee...	15 25
	18.	Check 1615. Nixon-Jones Printing Co., Printing and Stationery	12 45
	18.	Check 1616. C. S. N. Hallberg, Bulletin	188 86
December	1.	Check 1617. Gaus & Hamon, Miscellaneous Expenses...	50 00
	1.	Check 1618. American Bonding Co., Premium on Treasurer's Bond.....	37 50
	1.	Check 1619. F. T. Bannon, Miscellaneous Expenses	7 50
	16.	Check 1620. Alpha Photo-Engraving Co., Proceedings...	13 60
	16.	Check 1621. Nixon-Jones Printing Co., Printing and Stationery	5 00
	16.	Check 1622. C. S. N. Hallberg, Bulletin	66 67
	16.	Check 1623. C. L. Diehl, Salaries	250 00
	16.	Check 1624. J. W. England, Salaries.....	150 00
	16.	Check 1625. H. M. Whelpley, Salaries.....	375 00
	16.	Check 1626. Charles Caspari, Jr., Salaries	333 34
	16.	Check 1627. Wickersham Printing Co.— Proceedings	\$23 00
		National Formulary	7 65
			30 65
	22.	Check 1628. Regan Printing Co., Proceedings	50 67
	22.	Check 1629. C. S. N. Hallberg, Membership Campaign ..	66 18
	22.	Check 1630. John S. Bridges & Co. Section on Scientific Papers.....	\$3 40
		Printing and Stationery	4 45
			7 85
	22.	Check 1631. Nixon-Jones Printing Co., Printing and Stationery	12 50
	22.	Check 1632. C. S. N. Hallberg, Bulletin	161 97
	29.	Check 1633. Security Storage and Trust Co., Miscellaneous Expenses.....	10 00
	29.	Check 1634. H. M. Whelpley— Printing and Stationery	\$43 08
		Miscellaneous Expenses.....	11 58
			54 66
January	15.	Check 1635. E. F. Greathead, Printing and Stationery ...	11 90
	15.	Check 1636. John S. Bridges & Co., Printing and Stationery	4 00
	19.	Check 1637. Title Guarantee and Trust Co., Miscellaneous Expenses	5 00
	19.	Check 1638. C. S. N. Hallberg, Membership Campaign ..	53 00
	24.	Check 1639. C. S. N. Hallberg, Bulletin.....	193 33
February	3.	Check 1640. James H. Beal, Miscellaneous Expenses	5 50

February	3.	Check 1641. John S. Bridges & Co., Printing and Stationery	\$2 50
	3.	Check 1642. Wickersham Printing Co.— National Formulary.....	\$36 83
		Miscellaneous Expenses.....	2 20
		Proceedings	31 51
			70 54
	3.	Check 1643. Pittsburg Branch A. Ph. A., Membership Committee	33 00
	12.	Check 1644. Nixon-Jones Printing Co., Printing and Stationery	3 25
	12.	Check 1645. H. M. Whelpley, Printing and Stationery ...	21 24
	14.	Check 1646. John S. Bridges & Co.— Committee on U. S. P.....	\$10 58
		Committee on Unofficial Standards	19 00
		Section on Practical Pharmacy and Dispensing.	2 00
			31 58
March	1.	Check 1647. John S. Bridges & Co., Printing and Stationery	23 00
	1.	Check 1648. H. M. Whelpley, Miscellaneous Expenses. .	6 87
	1.	Check 1649. C. S. N. Hallberg, Bulletin.....	191 42
	1.	Check 1650. C. S. N. Hallberg, Membership Campaign ..	56 00
	1.	Check 1651. Charles Caspari, Jr.— National Formulary	\$37 49
		Proceedings	16 05
		Semi-Centennial Index.....	18
		Journals	26 36
		Badges and Bars	5 94
		Miscellaneous Expenses.....	4 26
			90 28
	1.	Check 1652. Security Storage and Trust Co., Miscellaneous Expenses	10 00
	13.	Check 1653. E. F. Greathead, Printing and Stationery ...	14 15
	13.	Check 1654. Nixon-Jones Printing Co., Printing and Stationery	24 90
	13.	Check 1655. H. M. Whelpley, Printing and Stationery...	21 84
	25.	Check 1656. Nixon-Jones Printing Co., Printing and Stationery	10 00
	25.	Check 1657. C. S. N. Hallberg, Bulletin	223 01
	25.	Check 1658. C. S. N. Hallberg, Membership Campaign ..	64 00
April	2.	Check 1659. Wickersham Printing Co., Proceedings	2,885 01
	5.	Check 1660. John S. Bridges & Co., Printing and Stationery	4 75
	5.	Check 1661. Rush Printing Co., Printing and Stationery..	4 25
	20.	Check 1662. Wickersham Printing Co.— National Formulary	\$82 68
		Miscellaneous Expense	1 34
		Proceedings	12 90
			96 92
	20.	Check 1663. C. S. N. Hallberg, Membership Campaign ..	56 25
	23.	Check 1664. C. S. N. Hallberg, Bulletin	179 70
	23.	Check 1665. Security Storage and Trust Co., Miscellaneous Expense	10 00

May	19.	Check 1666.	C. S. N. Hallberg, Bulletin	\$190 28
	19.	Check 1667.	A. H. Fetting, Badges and Bars.....	80 50
	19.	Check 1668.	H. D. Knisely, Miscellaneous Expense	32 40
	19.	Check 1669.	Wickersham Printing Co., Proceedings	1,182 09
	19.	Check 1670.	Freeman P. Stroup, Printing and Stationery.	33 00
	19.	Check 1671.	John S. Bridges & Co., Printing and Stationery	23 00
	19.	Check 1672.	J. W. England, Miscellaneous Expense.....	6 45
	19.	Check 1673.	Frank Hilg, Miscellaneous Expense	2 10
	19.	Check 1674.	Henry M. Whelpley, Printing and Stationery	42 48
	19.	Check 1675.	C. Lewis Diehl, National Formulary.....	41 80
	19.	Check 1676.	C. S. N. Hallberg, Membership Campaign ..	53 50
	19.	Check 1677.	Francis B. Hays, Miscellaneous Expense...	14 05
	20.	Check 1678.	George M. Beringer, Committee on Unofficial Standards	20 78
	20.	Check 1679.	George M. Beringer, Committee on U. S. Pharmacopoeia	9 40
	20.	Check 1680.	New Orleans Branch A. Ph. A., Committee on Membership	15 00
	20.	Check 1681.	Chicago Branch A. Ph. A., Committee on Membership	8 00
	26.	Check 1682.	Chas. H. LaWall, Section on Education and Legislation	2 50
	26.	Check 1683.	C. W. Johnson, Section on Education and Legislation	2 50
	26.	Check 1684.	Wickersham Printing Co.— National Formulary.....	\$115 00
			Miscellaneous Expense.....	44 40
			Proceedings	11 50
				170 90
	28.	Check 1685.	New York Branch A. Ph. A., Committee on Membership	6 00
	28.	Check 1686.	C. S. N. Hallberg, Miscellaneous Expense...	33 33
	28.	Check 1687.	C. Lewis Diehl, Miscellaneous Expense.	125 00
June	4.	Check 1688.	H. M. Gordin, Ebert Prize Fund	30 00
	4.	Check 1689.	M. I. Wilbert— National Formulary.....	\$31 50
			Section on Scientific Papers.....	7 60
				38 75
	4.	Check 1690.	A. R. L. Dohme, Committee on U. S. P....	11 75
	8.	Check 1691.	Wickersham Printing Co., National Formulary	45 75
	8.	Check 1692.	Edward Kremers, Section on Historical Pharmacy	45 00
	8.	Check 1693.	C. S. N. Hallberg, "Bulletin"	100 00
	8.	Check 1694.	J. W. England, Salaries	150 00
	8.	Check 1695.	C. Lewis Diehl, Salaries.....	375 00
	8.	Check 1696.	Henry M. Whelpley, Salaries	375 00
	8.	Check 1697.	Chas. Caspari, Jr., Salaries.....	500 00
	8.	Check 1698.	Nixon-Jones & Co., Printing & Stationery...	3 25
	8.	Check 1699.	John S. Bridges & Co., Printing & Stationery.	15 35

REPORT OF THE TREASURER.

475

June	8. Check 1700. Wickersham Printing Co , Proceedings	\$8 40
	8. Check 1701. Geo. M. Beringer, Committee on Unofficial Standards	45 00
	20. Check 1702. Eckenrode & Myers, Insurance.....	5 50
	20. Check 1703. Nixon-Jones Printing Co., Printing & Stationery	5 00
	20. Check 1704. Henry M. Whelpley, Miscellaneous Expenses	15 97
	20. Check 1705. O. Raymond Brown, Stenographers.....	113 30
	22. Check 1706. Regan Printing House, Bulletin	200 82
	22. Check 1707. C. S. N. Hallberg—	
	Bulletin.....	\$17 80
	Membership Campaign.....	58 00
		<hr/>
	23. Check 1708. H. M. Whelpley—	75 80
	Printing and Stationery	\$21 24
	Traveling Expenses.....	77 10
		<hr/>
		98 34
	23. Check 1709. Nixon-Jones Printing Co., Printing and Stationery	1 75
		<hr/>
		\$18,852 76

Cash received by the Treasurer and disbursed without checks.

Ebert Legacy Fund.....	\$2,800 00
Life Membership Fund	540 00
Centennial Fund	30 00
Endowment Fund.....	1,248 50
Procter Monument Fund	278 50
	<hr/>
	4,897 00
(\$278.50 = \$278.75 — \$.25, see Check No. 1590.)	<hr/>
	\$23,749 76

SUMMARY OF DISBURSEMENTS.

Proceedings	\$4,325 08
Stenographers	418 30
Journals for Reporter on Progress of Pharmacy.....	26 36
Salaries	2,508 34
Traveling Expenses.....	583 25
Committee on Membership	96 00
Membership Campaign.....	637 96
Certificates	10 00
Printing and Stationery	531 94
Miscellaneous Expenses.....	685 84
Insurance	27 10
Badges and Bars	114 44
Premium on Treasurer's Bond	37 50
Semi-Centennial Index.....	18
A. Ph. A. Bulletins	2,302 22
Section on Practical Pharmacy	5 98
Section on Scientific Papers	14 72
Section on Historical Pharmacy.....	48 26
Section on Commercial Interests	3 72
Committee on U. S. P.	66 03
Committee on Unofficial Standards	121 23

Section on Education and Legislation.....	\$8 98
Ebert Prize Fund	60 00
Ebert Legacy Fund	2,800 00
Procter Monument Fund.....	278 75
Life Membership Fund	540 00
Centennial Fund.....	30 00
Endowment Fund.....	1,248 50
Bond (5 \$1,000.00 St. Louis 4's).....	5,149 44
National Formulary	1,069 64
<hr/>	
Total Amount of Disbursements.....	\$23,749 76
Cash on hand July 1, 1910	3,747 83
<hr/>	
Total	\$27,497 59

APPROPRIATIONS AND DISBURSEMENTS, JULY 1, 1909, TO JULY 1, 1910.

	Appropriations.	Expenditures.
Proceedings	\$3,750 00	\$4,325 08
Salaries.	2,800 00	2,508 34
Printing and Stationery	531 94	531 94
Miscellaneous Expenses.....	685 84	685 84
Badges and Bars.	138 56	114 41
Journals for Reporter on Progress of Pharmacy	35 00	26 36
Stenographers	418 30	418 30
Committee on Membership	96 00	96 00
Traveling Expenses.....	631 15	583 25
Premium on Treasurer's Bond.....	37 50	37 50
Insurance	50 00	27 10
Certificates	35 00	10 00
Section on Scientific Papers	25 00	14 72
Section on Education and Legislation.....	25 00	8 98
Section on Commercial Interests	25 00	3 72
Section on Practical Pharmacy	25 00	5 98
Section on Historical Pharmacy.	50 00	48 26
Committee on Unofficial Standards	121 23	121 23
Committee on U. S. P.	66 03	66 03
Committee on Membership Campaign.	700 00	637 96
A. Ph. A. Bulletin	2,000 00	2,302 22
<hr/>		
	\$12,246 55	\$12,573 25

PROSPECTIVE ASSETS.

Not counting the amount due from members who will probably be suspended this year for the non payment of dues nor from the members whose residences are unknown, there is outstanding on the books of the Association, July 1, 1910:

Annual dues for 1909 (290 members).....	\$1450 00
Annual dues for 1910 (1309 members).....	6545 00
<hr/>	
	\$7995 00

This does not make an allowance for about 125 of the members who now owe \$10.00 each, and are likely to be suspended for the non-payment of dues in 1911.

Respectfully submitted,

HENRY M. WHELPLEY, *Treasurer.*

July 1, 1910.

ADDENDUM TO THE TREASURER'S REPORT, 1909-10.

The meetings of August 16, 1909, and May 3, 1910, both came within the fiscal year, just closed, and this report will appear in the Proceedings without being submitted at an annual meeting in the usual manner.

The increase in membership has been about the same as last year when the comparative lengths of the administration years are considered.

The Special Funds on July 1, 1910, are as follows:

	1909	1910
Ebert Prize Fund	\$949 38	\$927 12
Centennial Fund.....	2,327 67	2,413 67
Ebert Legacy Fund.....	.. ..	2,844 00
Endowment Fund.....	3,634 35	5,049 70
Life Membership Fund	16,629 90	17,319 85
	<hr/> \$23,543 30	<hr/> \$28,554 34
		<hr/> 23,543 30

Net increase\$5,011 04

The Association Assets may be summed up as follows:

Cash in Bank.....	\$3,747 83	
Bonds	10,000 00	
	<hr/>	
Available Assets		\$13,747 83
Permanent Funds		28,554 34
		<hr/>
Total Association Assets		\$42,302 17
Procter Fund held in trust.....	\$3,894 92	
College Prize Fund held in trust.....	29 82	
	<hr/>	<hr/>
		3,924 74
		<hr/>
Grand total		\$46,226 91

Ebert Prize Fund.

Balance from old account, July 1, 1909.....	\$949 38	
Interest on Deposit, Boston Penny Savings Bank	37 74	
	<hr/>	
Total		\$987 12
Prize to Henry Kraemer	\$30 00	
Prize to Harry M. Gordin	30 00	
	<hr/>	<hr/>
		60 00
		<hr/>
Total, July 1, 1910		\$927 12

Centennial Fund.

Massachusetts 3 per cent. Registered Bond	\$1,000 00	
Boston Penny Savings Bank, July 1, 1909.....	1,329 67	
Interest Deposited in Boston Penny Savings Bank, July 1, 1909-July 1, 1910.	84 00	
	<hr/>	
Total to July 1, 1910		\$2,413 67

Ebert Legacy Fund.

December 14, 1909, received from Ebert estate.....	\$2,800 00	
Interest December, 1909, to June, 1910	44 00	
	<hr/>	
Total July 1, 1910.....		\$2,844 00

Endowment Fund.

Balance from Old Account, July 1, 1909	\$3,608 35
Received, last year, too late to Bank.....	\$26 00
Donation of C. E. Dohme	1,000 00
Donation of J. H. Beal	26 00
<hr/>	
Deposited, Boston Penny Savings Bank, July 24, 1909	1,052 00
Interest Boston Penny Savings Bank, October 13, 1909.....	71 91
Donation of J. U. Lloyd	\$25 00
Donation of H. H. Rusby	5 00
<hr/>	
Deposited in Boston Penny Savings Bank, October 30, 1909.....	30 00
Donation of S. A. D. Sheppard	\$26 25
Donation of W. A. Frost	5 00
Donation of John Coleman	10 00
Donation of J. F. Pearson.....	5 00
Donation of J. H. Beal	26 25
<hr/>	
Deposited Boston Penny Savings Bank, February 19, 1910.....	72 50
Donation of H. H. Rusby.....	\$5 00
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Deposited in Boston Penny Savings Bank, April 18, 1910.....	5 00
Interest on Deposit Boston Penny Savings Bank, April 13, 1910	94 94
Donation of J. U. Lloyd	\$35 00
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Deposited in Boston Penny Savings Bank, April 25, 1910.....	35 00
Donation of John Coleman	\$5 00
Donation of John F. Patton	1 00
Donation of S. A. D. Sheppard.....	10 00
Donation of E. G. Eberle	5 00
Donation of J. D. A. Hartz.....	5 00
Donation of Wm. P. Gregorius.....	15 00
Donation of John Hepburn.....	5 00
Donation of T. D. McElhenie.....	1 00
Donation of H. H. Rusby	5 00
Donation of Wm. L. Dewoody	1 00
Donation of C. Lewis Diehl	1 00
Donation of G. Scherling.....	5 00
<hr/>	
Deposited in Boston Penny Savings Bank, May 26, 1910.....	59 00
Donation of F. M. Apple.....	\$10 00
<hr/>	
Deposited Boston Penny Savings Bank, May 26, 1910	10 00
Donation of F. G. Godbold	\$5 00
Donation of F. G. Fricke	5 00
<hr/>	
Deposited in Boston Penny Savings Bank, June 3, 1910	10 00
Donation of Conrad Schadt.....	\$1 00
<hr/>	
Deposited in Boston Penny Savings Bank, June 30, 1910	1 00
<hr/>	
Total July 1, 1910.....	\$5,049 70

Life Membership Fund.

Massachusetts State Bonds	\$13,000 00
Boston Penny Savings Bank, July 1, 1909	3,629 90
Interest on Massachusetts State Bonds (6 mos.)	\$195 00
Interest Boston Penny Savings Bank (6 mos.)	71 78
Life Membership, H. N. Siegenthaler	25 00
Interest on Massachusetts State Bonds	195 00
Life Membership Fee, J. O. Burge	25 00
Interest on Boston Penny Savings Bank	78 17
Life Membership Fee, Leo Eliel	25 00
Life Membership Fee, S. L. Hilton	25 00
Life Membership Fee, J. O. Schlotterbeck	25 00
Life Membership Fee, A. L. Morgan	25 00
<hr/>	
Deposited in Boston Penny Savings Bank (from July 1, 1909-July 1, 1910)	689 95
<hr/>	
Total, July 1, 1910	\$17,319 85

Procter Monument Fund.

Held in trust.

January 27, 1909, Received of B. T. Fairchild	\$3,413 33
July 19, 1909, Collected by H. J. Watson	\$14 00
July 19, 1909, Collected by T. J. Keenan	32 50
Contributions of A. P. Sharp	20 00
Contributions of Resinol Chemical Co.	10 00
Contributions of the New Jersey Pharmaceutical Association	177 00
<hr/>	
	253 25
Interest on Deposit	2 15
Interest on Time Deposit (12 mos.)	136 53
C. B. Smith & Co.	25 00
Interest on Time Deposit from January 27, 1910, to July 1, 1910	64 66
<hr/>	
Total July 1, 1910	\$3,894 92

College Prize Fund.

(Formerly called "Mottet Fund.") Held in trust.

Balance from Old Account, July 1, 1909	\$27 58
October 13, 1909, Interest	\$1 66
April 13, 1910, Interest	58
<hr/>	
	2 24
<hr/>	
Total, July 1, 1910	\$29 82

This is my second annual report as Treasurer, and I appreciate the co-operation of my associate officers in my effort to keep the Association in as good a financial condition as possible. The number of members to be suspended for the non-payment of dues is larger than I anticipated, in spite of systematic and persistent efforts to reduce the number to a minimum. Among those to be suspended I find the names of many who recently joined, and evidently do not appreciate membership in the Association. The number of older members to be dropped is gratifyingly small. This indicates that some are willing to join and pay one or two years' dues and then be suspended for the non-payment of dues. I must particularly thank the officers, the members of the Council and

the members of the General Committee on Membership for their co-operation in preventing delinquent members from remaining on the suspension list. Letters from personal acquaintances and calls by local associates have saved quite a number who would otherwise have been suspended this year.

Very truly,

HENRY M. WHELPLEY, *Treasurer.*

July 1, 1910.

The report of the General Secretary was called for as the next order of business.

The Secretary stated that, as in the case of the Treasurer, his statement of the financial accounts in his care was only a partial one, and that a complete report for the year would be ready on July 1st. He then proceeded to make a summary of his accounts for the past nine months. His report complete for the fiscal year ending June 30, 1910, here follows:

REPORT OF THE FINANCIAL ACCOUNTS IN THE CARE OF THE GENERAL SECRETARY.

A. RECEIPTS AND EXPENDITURES ON ACCOUNT OF THE NATIONAL FORMULARY FROM JULY 1, 1909, TO JULY 1, 1910.

I. Receipts.

From Sales and Payment of Bills due July 1, 1909 \$4,154 91

II. Expenditures.

Paper and Press Work, 3,100 copies at 8.55 cts.....	\$265 08	
Binding 3,300 copies in cloth at 11½ cts.....	379 50	
Binding 450 copies in sheep at 28½ cts.....	128 25	
Rebinding 14 copies.....	2 00	
Expressage, \$108.07; Postage, \$25.16.....	133 23	
510 Mailing Cases.....	7 65	
38 Packing Boxes at 25 cts.....	9 50	
Typewriting done at office of Chairman Diehl.....	106 80	
Typewriting for the Committee.....	3 00	
Stationery for the Committee.....	8 48	
Mimeograph Supplies, \$18.95; Paper, \$6.95.....	25 90	
Affidavit.....	25	
		1,069 64

III. Remittances.

To Treasurer, as per Treasurer's Receipts..... 4,154 91

IV. Sales.

To Dealers and Individuals, as per Ledger Accounts 3,722 60

V. Accounts Unpaid.

By Dealers..... 455 81

VI. Bills Due by the Association.

Expressage to June 10, 1910, \$16.88; 9 Packing Boxes, \$2.25..... 19.13

VII. Stock on Hand.

Copies in flat sheets (unbound)	000
Copies bound in cloth	603
Copies bound in cloth, interleaved	15
Copies bound in sheep	55
Copies bound in sheep, interleaved	78
	<hr/>
	751

B. SUMMARY OF TOTAL RECEIPTS AND EXPENSES ON ACCOUNT OF THE NATIONAL FORMULARY SINCE 1888.

Receipts to June 30, 1909 (See Proc., Vol. 57, p. 476)	36,163 98
Receipts from July 1, 1909, to July 1, 1910	4,154 91
	<hr/>
	\$40,318 89
Expenses to June 30, 1909 (see Proc., Vol. 57, p. 475).	\$20,540 62
Expenses from July 1, 1909, to July 1, 1910	1,069 64
	<hr/>
	\$21,610 26
Total Receipts from Sale of Physicians' Epitome from June, 1900, to July, 1910.	\$559 62
Total Expenses on Account of Physicians' Epitome from June 1, 1900, to July 1, 1910	649 45

C. SALE OF PROCEEDINGS.

Receipts from July 1, 1909, to July 1, 1910	\$43 05
Remitted to Treasurer, as per Treasurer's Receipts	43 05

D. RECEIPTS AND EXPENSES ON ACCOUNT OF SEMI-CENTENNIAL INDEX.

Total Receipts from July 1, 1903, to June 30, 1909	\$2,306 91
Receipts from July 1, 1909, to July 1, 1910	4 18
	<hr/>
	\$2,311 09
Total Expenses from July 1, 1903, to June 30, 1909	\$3,123 40
Expenses from July 1, 1909, to July 1, 1910	18
	<hr/>
	\$3,123 58

E. ACCOUNT OF BADGES AND BARS.

Receipts from Sales of Badges and Bars from July 1, 1909, to July 1, 1910 ..	\$143 30
Remitted to Treasurer, as per Treasurer's Receipts	143 30
Stock on hand July 1, 1910: Gold Badges, 20; Gold Bars, 81.	
Total Receipts from Sales of Badges and Bars to July 1, 1909 ..	\$1,500 25
Receipts from Sales from July 1, 1909, to July 1, 1910	143 30
	<hr/>
	\$1,643 55
Total Cost of Badges and Bars to July 1, 1909	\$1,441 69
Cost of 40 Gold Bars, received July 8, 1909	28 00
Cost of 6 Special Bars, made to order	5 60
Cost of 30 Gold Badges, received April 30, 1910	52 80
Cost of 40 Gold Bars, received April 30, 1910	28 00
Registration Fees.	18
	<hr/>
	\$1,556 27

CHAS. CASPARI, JR., *General Secretary.**Baltimore, July 1, 1910.*

The Chair stated that, without objection, the report of the Secretary would be accepted and placed on file, and it was so ordered.

REPORT OF THE AUDITING COMMITTEE.

DR. JAMES H. BEAL, *Chairman Council A. Ph. A.* :

Dear Sir : We have examined the books of Henry M. Whelpley and Charles Caspari, Jr., respectively Treasurer and General Secretary of the American Pharmaceutical Association, for the fiscal year 1909-10 and compared the records with the vouchers and found them correct. We have found a proper accounting for all the funds of the Association. The cash balance on June 30, 1910, corresponds with the book of the International Bank of St. Louis and the registered bonds in the hands of the Treasurer.

F. G. UHLICH, *Chairman,*

OTTO F. CLAUS,

L. A. SEITZ, *Auditing Committee.*

St. Louis, Mo., July 30, 1910.

REPORT ON THE INVESTED FUNDS OF THE ASSOCIATION.

ST. LOUIS, *July 30, 1910.*

To the Officers and Members of the American Pharmaceutical Association;

We, the undersigned, have in accordance with Rule 6 of General Rules of Finance, examined the securities contained in the Association Box (4227) at the Title Guaranty Trust Co., St. Louis, and found the following :

A. Ph. A. General Fund Bonds.

5 St. Louis City Reg. 4 per cent. Bonds, Nos. 705, 706, 707, 708, 709.....	\$5,000 00
1 St. Louis City Reg. 4 per cent. Bond, No. 717.....	5,000 00
Total	\$10,000 00

A. Ph. A. Centennial Fund Bond.

1 Mass. State Reg. 3 per cent., No. 1705.....	\$1,000 00
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A. Ph. A. Life Membership Fund Bonds.

1 Mass. State Reg. 3 per cent., No. 1701.....	\$10,000 00
3 Mass. State Reg. 3 per cent, Nos. 1702, 1703, 1704.....	3,000 00
Total	\$13,000 00

A. Ph. A. Procter Monument Fund.

Certificate of Deposit No. 57,115, July 1, 1910, International Bank of St.

Louis \$3,894 92

H. M. WHELPLEY, *Treasurer,*

F. G. UHLICH, *Chairman Auditing Committee.*

Subscribed and sworn to before me this 30th day of July, 1910. Witness my hand and notarial seal.

STANLEY B. SIMPSON,

[SEAL]

Notary Public, City of St. Louis. Mo.

My term expires June 13, 1913.

An opportunity was here given Mr. Remington, Chairman of the Special Committee, to consider the desirability of the publication of the National Formulary by the U. S. Pharmacopœial Convention, to make report, and he presented the following :

REPORT OF COMMITTEE TO CONSIDER THE DESIRABILITY OF CHANGE
IN PUBLICATION OF THE NATIONAL FORMULARY.

Your Committee to whom was intrusted the duty of reporting upon "the desirability and practicability of turning over the publication of the National Formulary to the United States Pharmacopoeial Convention," respectfully report that after due consideration this recommendation of our honored President is not approved.

The National Formulary is an inheritance of the American Pharmaceutical Association, upon which much labor has been spent by this body, and the National Food and Drugs Act designated the National Formulary as one of its standards, and this without any solicitation on the part of this Association. It is believed by your Committee that every effort should be made to improve the National Formulary by eliminating its shortcomings and introducing standards, but they believe that it should remain the property of this Association and given the heartiest support of all of its members. There should be co-ordination between the U. S. Pharmacopoeia and National Formulary Committees to prevent duplication or confusion in the standards.

JOSEPH P. REMINGTON,
WILLIAM C. ANDERSON,
L. F. KEBLER,
C. LEWIS DIEHL,
GEORGE M. BERINGER.

Mr. Hynson, seconded by Mr. Meissner, moved to accept the report of the committee as read, and the motion prevailed.

The Chair called for the report of the Committee on Reorganization as the next business in order, and Mr. Hallberg, chairman of that committee, presented the following report :

REPORT OF THE COMMITTEE ON REORGANIZATION.

To the American Pharmaceutical Association :

The committee has carefully considered the recommendations made by President Oldberg in his address at the last annual meeting as to changes in the By-Laws, etc. These were referred to the Committee on Reorganization by the Council, to which this committee has reported.

There are a few additional suggestions that this committee would like to make as recommendations, as follows :

1. That when a member is in arrears in dues more than one year that he be notified, and that unless such dues are paid within thirty days his name be stricken from the rolls.

The reason for this suggestion is the conviction that according to our present plan members fall behind in their dues without realizing the seriousness of their position, and when they owe an amount of from \$10.00 to \$15.00 it is very difficult to get them to pay up, and the result is that their names are dropped any way. It is our belief that not as many members will be lost if this rule is enforced, as it is in all other organizations. One hundred and twenty names have been dropped for non-payment of dues since the last annual meeting.

2. That the Treasurer issue a little pocket-card as a membership receipt for the current year, and that every member on registering at the meeting must show this card or receive a duplicate from the Treasurer in order to qualify him to register as a member.

3. That to only such registered members the badge, program, invitations and such other matter as is usually given to members be issued.

4. That provision be made for the families of the members and other visitors by providing them with a visitor's badge and such other matter as may be decided by the Local

Committee of Arrangements; that a blank be devised to be filled out for such members' families and visitors, signed by a member recommending him. Also the following:

5. That the "Bulletin" of the A. Ph. A. of the month preceding the annual meeting be a complete program of such meeting or a separate program be published; that it contain the programs of all the Sections, abstracts of papers and all similar matter desirable as information to the members concerning the meeting.

6. That the Chairman of each Section be required to transmit to the editor of the "Bulletin" such program or abstracts not later than thirty days prior to the meeting, or within time sufficient for its publication.

7. That papers may be printed in advance, but that the original paper be given to the Secretary of the Section to be certified by him and the retiring Chairman of the Section.

8. That such papers are eligible as publications of the A. Ph. A. only when thus certified.

9. That such papers be turned over to the General Secretary and become the property of the Association, but papers printed in advance may, when certified, become public property.

The question of concurrent sessions of the different Sections seems to be solving itself through the only method satisfactory, namely, experience. Since this was regarded as the most important change desired, there is no further change proposed except the wish that in the very near future the Association may be able to concentrate its meetings within four days.

Respectfully submitted,

E. G. EBERLE, Dallas, Tex.,

M. I. WILBERT, Washington, D. C.,

C. S. N. HALLBERG, *Chairman*, Chicago, Ills.

Chicago, April 27, 1910.

Mr. Mayo, of New York, duly seconded, moved to accept and adopt the report just made.

Mr. George M. Beringer, of New Jersey, asked if the passing of that motion carried with it the ruling of the Association, and upon being answered by the Chair in the affirmative, moved that ninety days be substituted for the thirty days' notice to delinquent members provided in the report.

Mr. Hallberg objected to this motion, and stated that the reason the Committee had put it at thirty days was because the Committee believed that that would give the delinquent ample time to collect the money to pay his dues, and he would not be likely to forget it, whereas he would be likely to forget it if he were given three months' notice. He said the By-Laws specifically provided that the Treasurer was to notify the delinquent that he would be required to pay within thirty days, and, failing to do so, his name would be reported to the Council, and the Council might hold him up until such time as it saw fit.

At this point Mr. Hynson asked Chairman Hallberg if he would not like to have this matter referred to the Council, and Mr. Hallberg responded that there would be no objection to that. The Chair, however, suggested that there might be a practical objection to this, if it involved a change in the By-Laws, as, if the Association waited on the Council to act, there might not be time then to make the necessary changes in the By Laws.

The motion to refer to the Council was seconded by Messrs. Apple and Sayre.

Mr. Beringer renewed his objection to the thirty days' clause, and argued for three months as entirely reasonable, particularly as that was a great curtailment of the time for dropping delinquents as compared with the present status. He reminded the members that the question of membership was a vital one to the Association, and the proposition of maintaining the membership at anything like a respectable proportion of the many thousands of pharmacists of America was a serious one. He felt that so short a time might perhaps do an injustice to members who were ill or away from home at the time, and he considered it a matter of simple justice to all the members that the time of notice should be at least three months before dropping a member from the rolls.

Mr. Harry B. Mason, of Detroit, suggested that a word from the Treasurer on this subject might be of value.

Treasurer Whelpley said that he did not quite understand this feature of the proposed amendments. He wanted to know from what date the thirty days' notice was to apply. Mr. Hallberg said it was to run from the end of the fiscal year for which the dues accrued. Mr. Whelpley said he understood this to mean that those who might now owe for the fiscal year beginning the first of July last would be dropped after the first of August next for non-payment of dues. Mr. Hallberg answered in the affirmative, stating that if such delinquent members did not pay within thirty days from the first day of July next their names would be presented to the Council.

The Chair agreed with Mr. Beringer that a change to three months would be desirable, as a large number of members might be away on their vacations at that particular time and would not get the notice until their return.

Continuing, Treasurer Whelpley stated that the plan of referring to the Council did not appeal to him as a very practical one. He said he thought the matter should be left as largely as possible in the hands of the Treasurer, as he came in personal contact with the members through correspondence, and the Council was not in a position to judge, except on the advice of the Treasurer. At one time the Association had made it exceedingly difficult for a member to get out of it, and almost as difficult for him to get back again after having once gotten out. There was a time when delinquent members were carried on the books for six years, and if a member fell behind one year, and desired to be dropped, he was carried on the books for three years—because the By-Laws said at the end of three years a member should be dropped or suspended for non-payment of dues. But now the By-Laws and rules and customs have been changed, and if a member desires to be dropped for non-payment of dues, and he owes for only one year, he can be dropped, and don't have to be carried

for three years. There was also a time when, in order to get back into the Association, it was necessary for delinquent members to pay up all the dues owing at the time they were dropped, but now the delinquent is taken back without paying any of such dues, and comes in as a new member. Mr. Whelpley said that the Association was gradually working down to the point where the energies of the Treasurer would be devoted to the first twelve months of delinquency. He said that, personally, he would like to see what could be done along these lines, before a radical change was made in the present system.

Mr. J. L. Lemberger, of Pennsylvania, was in favor of moving very slowly in the matter of dropping members. He said that in the Pennsylvania Association they had found it was much better to move along conservative lines than to act rashly. The Chair suggested that they were "slower in Pennsylvania" than in this Association. Mr. Lemberger agreed that "*Philadelphia* was slower," but reiterated his doubts of the wisdom of adopting such a radical change as that set forth in the report of the Committee. He asked if this question had been considered by the Council, and the Chair responded that the substance of it had been—that the general idea of dropping after one year had been considered and approved. Mr. Lemberger said that some of the changes as indicated by the report seemed to him severe, and that an experience of thirty years along these lines led him to feel that the Association ought not to act so hurriedly, so rashly, in this matter, and he hoped that this part of the report would be modified.

Mr. Thomas F. Main, of New York, said that he thought the differences of opinion on this proposition had been drawn out in a way to inform the Council that there was a difference of opinion as to the time that should elapse after notification before dropping a delinquent member, and that he was in favor of so referring the report.

The motion to refer to the Council was then put to a vote and carried.

The next committee report submitted was that of the Committee on Parcels Post, which, in the absence of the Chairman, the Secretary presented as follows :

REPORT OF COMMITTEE ON PARCELS POST.

To the American Pharmaceutical Association Convention, assembled :

Your Committee on Parcels Post has very little to report at this time, as up to three weeks ago there seemed to be no prospects of any hearing at this session on any Parcels Post Bill, either rural or general. The committee kept posted during this time, and it did seem as if there would be nothing to do. But the Committee on Post Offices and Post Roads decided to have a hearing on the Parcels Post Bills so that all persons interested, for or against it, might be heard. The hearing began on April 25 and continued for five days. Your committee appeared and strongly opposed the adoption of a Parcels Post. Representatives of nearly all the retail interests of this country also appeared before the committee in opposition to the adoption of any form of this bill. The combined retail interests of this country put up very good reasons why the government

should not adopt a Parcels Post. It looked to the chairman of your committee as if the real promoters of the bill were interested in mail order business. At this time it is unknown whether or not the committee will make a report at this session, as there is probably not enough time to go over and formulate any kind of a report, as it is quite late in the session.

Respectfully submitted,

W. S. RICHARDSON, *Chairman.*

On motion of Mr. Sayre, seconded by Mr. Eliel, the report as read was accepted and adopted.

F. L. Hilton, Chairman, read as follows the report of the Committee on National and State Legislation :

REPORT OF THE COMMITTEE ON NATIONAL AND STATE LEGISLATION.

To the Officers and Members of the American Pharmaceutical Association :

In offering this annual report on behalf of the Committee, I feel that as Chairman of the Committee I should offer apologies to the other members of the Committee, at this time, for the reason that I have been unable to present to them for their consideration, this report previous to the meeting.

The time elapsing since last meeting being so short, Congress still in session, and the fact that the Chairman, by sickness was compelled to lose a month, it has been impossible for me to prepare a report until practically the last minute. The report now may fail to bring out some important matters enacted by Congress the past few days.

Before presenting a resume of what has been accomplished the past year with respect to legislation of a national character only, I desire to call the attention of the President and members of the Association to the fact that the report of this Committee at the Los Angeles meeting contained recommendations which were adopted, namely, that this Committee be made a committee on National Legislation and transfer all matters pertaining to State legislation to the Section on Education and Legislation and concentrate its efforts on legislation proposed to Congress and thereby eliminate the multiplication of committees dealing with legislation. (See Proceedings 57, p. 529).

On looking over the proceedings this committee as named remains the same, the Committee on National and State Legislation, and numerous other committees have been appointed to take charge of special legislation, thus again a multiplication of committees to handle this subject, therefore the past year in each and every case where bills have been introduced or hearings held on matters pertaining to legislation for which a special committee had been appointed, the Chairman of this Committee did not take any part, consequently this report does not contain any reference whatever to legislation for which a special committee had been appointed.

The recommendations adopted at the Los Angeles meeting with respect to having a bill passed by Congress empowering the Interstate Commerce Commission to regulate the express charges of the country has not been taken up by the Committee for the reason, the chairman was not aware of such recommendations until he received his copy of the "Proceedings" about ten days ago.

During the two sessions of the sixty-first Congress, the second of which has not as yet adjourned, over 33,000 bills have been introduced, many of which affected the interests of the pharmacist, only one of which has as yet become a law, the bill known as the Insecticides Bill.

Of all the bills introduced and now pending that is most obnoxious to both the practice of medicine and pharmacy, and the bill that requires close observation, is the one introduced by Congressman Coudrey, providing for the government editing and publishing the U. S. Pharmacopoeia. This bill is poorly drawn, and in its present form is ab-

solutely ambiguous and absurd. With the changed conditions in Congress that have been recently brought about, it is an exceedingly difficult matter to predict what may or may not occur in the future, what has heretofore seemed likely to receive no consideration is now being pushed forward with the evident purpose of gaining as much advantage as possible, and is clearly demonstrated by the fact that the Committee on Post Offices and Post Roads decided to grant hearings on all Parcels Post measures April 25th, after previously stating no hearings would be held this session; not knowing what forces are pushing the Coudry bill, we do therefore then recommend that this bill be kept under close observation, and that the American Pharmaceutical Association concentrate every possible effort to defeat it.

Following the recommendations of last year we have purposely omitted all comments pertaining to state legislation, believing that the Section on Education and Legislation will discuss the subject fully, as has been the custom.

The most important bills affecting the pharmacist and now pending are as follows: bills establishing a department of Public Health, bills amending the statutes relative to trademarks and patents, bills to prohibit the transportation and the sale of spirituous, vinous and malt liquors, in states having prohibition laws, a bill to regulate the manufacture of smoking opium, a bill imposing a tax upon and regulating the production, manufacture and distribution of certain habit forming drugs in interstate commerce, a bill to regulate the transportation of habit-forming drugs in interstate commerce, a bill to regulate the practice of pharmacy and sale of poisons in the consular districts of the United States in China, numerous bills proposing amendments to the Food and Drugs Act, and a bill to prevent the manufacture, sale and transportation of adulterated or misbranded paint.

The bills proposing to establish a Department of Public Health have not been fully considered by the Committee having the matter in charge, while these bills affect a few of the pharmacists in the government service only, they are for the public good and if the pharmacists are properly cared for they should receive our endorsement. Some provision should be made to amend the bill so as to provide for a bureau of pharmacy. This Committee has taken no action owing to lack of knowledge of the position of the Association with reference to the proposition.

Of the many bills relating to amendments to the trade-mark and patent laws, several of minor importance have been reported, placed on the calendar, but none have been acted upon by either house of Congress. Our aim with reference to amending the patent laws should be along the same lines as recommended last year, that is, not to grant any more rights and privileges to a citizen of a foreign country than what the respective foreign country grants to a citizen of the United States: any bill with this purpose in view should have our support.

The bills relative to aiding States in preventing the sale of spirituous, vinous or malt liquors where said State laws prohibit such sales should have our support, provided provision is made whereby druggists can procure their alcohol for use in manufacturing medicinal pharmaceutical preparations. The time has arrived when it is necessary for pharmacists to divorce from their business the sale of all alcoholic beverages. We should be pharmacists and not rum-sellers, and relinquish to licensed dealers the sale of all alcoholic beverages even although the demand should be by prescription.

The bill to regulate the manufacture of smoking opium is of so little importance to the drug trade, the justice of same so apparent and the necessity for stringent laws so urgent for governing it, we should unhesitatingly support any measure that has for its purpose the abolishment or the better control of such practices.

The bill imposing a tax upon and regulating the production, manufacture and distribution of habit forming drugs, known as the Cullom bill, should have our support. This bill requires all dealers to be licensed and the internal revenue laws are to be amended

so that this branch of the government service will have complete charge of the enforcement of the provisions of the bill, if it should become a law. It prescribes to whom licensed dealers may sell in interstate commerce. It does not interfere in any way with the State controlling such matters within its borders, but such a measure will prohibit the promiscuous sale of habit-forming drugs to every one except licensed dealers in interstate commerce. The recent exposé of the deplorable conditions existing in one of our large cities, clearly shows that the same conditions exist in nearly, if not every one of our large cities and the honest pharmacist should use every power at his command in assisting the authorities to put a stop to such practices for the sake of humanity and thereby help to save the lives of thousands of persons. The bill to regulate the sale of habit forming drugs in interstate commerce would seem to control the situation, yet in the judgment of the Chairman of this Committee, it will not secure the results as well as the previous bill that has been discussed compelling the licensing of all dealers; therefore I would recommend that this Association lend its support and direct its efforts toward securing the passage of the bill known as the Cullom bill.

The bill to regulate the practice of pharmacy in consular districts of the United States in China does not need any consideration other than to see that the provisions thereof are in conformity with the same provisions usually followed in this country

Of the bills proposing amendments to the Food and Drugs Act, the one providing for the editing and publishing of the U. S. Pharmacopœia by the U. S. government has been noticed, and requires no further comment.

The amendment compelling all drugs recognized by the U. S. P. and N. F. to be of the standard provided for by the U. S. P. and N. F., and if where no standard is provided, giving authority to the Secretary of Agriculture to establish standards, should be carefully considered before any action is taken.

The pure paint bill while not affecting the retail drug trade to any extent should be supported; there is no reason whatever why we should not have pure paints as well as pure drugs.

Before bringing this report to a close I desire to call the attention of the Association to what has been accomplished the past year by the careful and judicious enforcement of the Food and Drugs Act by the department having this duty in charge. The department has secured since January 1, 1910, decisions from the courts in 135 cases, 29 of which were drug cases, and has lost but one case. In conjunction with the Treasury Department they have prevented the introduction of many lots of spurious or adulterated drugs from entry.

The work performed with reference to lemon oil is most exhaustive and will prove of much benefit to the people of the United States. Many other investigations have been made that will prove valuable at this time to both medicine and pharmacy. Food Inspection Decision 112, amending regulation 28, the labeling of derivatives has caused some uneasiness in certain quarters; under this regulation as amended, it is now necessary not only to specify the substance on the label, but to clearly state from what substance it is derived, as for example, codeine, derivative of opium. While this decision was promulgated early in January, it did not become effective until April 1st, thereby giving sufficient time to make necessary changes in labels.

In conclusion, the Chairman desires to extend his most sincere thanks to the members of the committee, and on behalf of the committee, to thank the officers and members of the Association for the confidence and trust placed in them to look after the Association's interests and to carry out its wishes.

In completing the year's work the Chairman personally desires to thank the officers and members for the confidence placed in him. I have served as a member of this Committee for three years, and as Chairman the past two years; I fully believe in rotation in office, and on the advice of my physician I have informed the newly-elected President

of my inability to again serve as Chairman of the Committee. While I have found this work exceedingly pleasant, it is now necessary for me to relinquish this charge; I will always have the interests of this Association at heart, and I assure you whenever an occasion should arise whereby I can be of assistance, I will do all within my power to advance its interests.

Circumstances over which I have no control compel me to take this step and to decline to serve any longer on the Committee.

Respectfully submitted,

S. L. HILTON, *Chairman.*

The Chair said he wished to express his thanks to the Chairman of this Committee and his colleagues for the valuable work they had done. He said there were two recommendations in the report.

Mr. Hallberg said there were several recommendations in the report that he thought should be very carefully considered: That some things had transpired since the report of the Committee was drawn which were not included in it. He believed that the Association was scarcely in a position this morning to discuss the recommendations of the report, and expressed the opinion that if it were referred to the Section on Education and Legislation it could be discussed much more intelligently. He moved to so refer it, and the motion was seconded by Mr. Sayre.

The Chair asked Mr. Hallberg if it was his idea that such reference meant that the Section would have power to act upon the recommendations for the Association and approve them, or whether they would come back to the Association for final action. Mr. Hallberg replied that whatever action might be taken in the Section would be reported back to the Association in final session.

The Chair said he would put the motion to refer to the Section on Education and Legislation for consideration, with the understanding that that Section should report back to the Association in general session its recommendations. He said he would suggest that it might be well when this was done for the Chairman of the Committee to submit to the Section on Education and Legislation copies of the two bills to which reference was made in the report. He said the report recommended that every effort should be made to pass the Cullom Bill, and that every effort should be made to defeat the Coudrey Bill. He happened to know, however, considerable about the latter bill, and while there were some features about it that pharmacists could not approve, there were other features that he thought the Association would be very glad to approve.

Mr. Hilton said he would be glad to submit copies of the bills in question to the Section, but unfortunately had no such copies with him, and could not do so at this time.

Mr. Hallberg suggested that the bills were already printed in the "Bulletin."

The motion to refer to the Committee on Education and Legislation was then put to a vote and carried.

The Secretary said he had been requested to call for the report of the Committee on Time and Place of Next Meeting at this time.

Mr. Sayre, of the committee, said that the Committee on Time and Place of Next Meeting were pleased to report that they had received very cordial invitations for the 1911 meeting from St. Louis, Missouri; Rochester, New York; Boston, Massachusetts; Saratoga, New York; Chattanooga, Tennessee; New Orleans, Louisiana; Kineo, Maine; and Cedar Point, Ohio. Mr. Sayre said that he wanted to say in regard to the last-named place that no official communication had been received, but the committee understood that an invitation was extended, and parties were present here distributing badges and asking that the members of the Association vote for Cedar Point, and the committee thought it was best to include that point among the number submitted. He said that the committee further recommended that those persons present that were interested and were prepared to make statements on behalf of their respective localities should be heard at this time. He asked that the committee's report be received without expression of preference as to place of meeting, leaving the Association to decide this matter.

Mr. F. W. Meissner, of LaPorte, Indiana, moved that the report of the Committee on Time and Place be received, and, further, that the Association proceed to choose by ballot the place of next meeting.

Mr. Charles M. Ford, of Denver, said this would take considerable time, as each point named had its advocates and they would want to make speeches. He moved that the report of the committee be referred back to it, and that the committee take it upon themselves to listen to the speeches and present a recommendation.

The Chair stated that, on behalf of the committee, he wanted to say that when Mr. Sayre arrived on the ground he was the only member of the committee present, and most of the communications now before the committee had not been received; that Mr. Sayre stood alone, and it was only last evening that the other members of the committee had put in an appearance. He thought, therefore, the Association should extend some consideration to the committee, for "they certainly were in hard lines."

Mr. H. L. Taylor, of Albany, New York, said he would like to second the substitute motion of Mr. Ford if the mover would allow him to enlarge it. He said Mr. Ford's motion was to refer back to the committee, with instructions to recommend a place of meeting. He would like to add to that, that the President, or the Association, proceed to complete the committee, by naming other members in place of the absentees, so that the Chairman might have a complete committee to act with him. Mr. Ford said he would be glad to accept this suggestion.

Mr. Sayre stated that if it was insisted upon, the committee was ready now to make a recommendation: that he had made this very statement to his colleagues, that a vote without a recommendation would be objected to.

Mr. F. C. Godbold, of New Orleans, said he thought it was proper to state that the papers received by the Chairman of the Committee, Mr. T. W. Jones, of Los Angeles, had been sent to Mr. Sayre, with request that he act as Chairman.

The Chair here suggested that, in view of the statement by Mr. Sayre that the committee was ready now to make a recommendation, if insisted upon, it would be unnecessary to put the motion to refer back to the committee.

Mr. Caswell A. Mayo, of New York, favored the original motion of Mr. Meissner, and said he hoped the substitute motion of Mr. Ford would be voted down. It would require a little time and trouble to ballot, but there were many interests involved, and each member should have an opportunity to express his individual opinion. If the report was sent back to the Committee and it made a recommendation, there would be no choice between places. The mission of the Association was to select a place, and the only way to do that was to have the names from which to select before the members, and let each individual say where he thought the Association should go.

The Chair expressed the opinion that this could be done just as well after the recommendation of the committee was made as any other way—that if the substitute motion was passed, the Chairman of the committee would then recommend a place, and the Association could take any action it saw fit.

Mr. Hallberg, of Chicago, expressed the view that it was the special province and duty of the Committee on Time and Place to consider the advantages and conditions attaching to the several places of meeting proposed, and to see that the proper railway facilities and rates were secured, as also the proper hotel accommodation and rates. These were matters that the Association at large naturally could not go into, and they should carefully sift these things and guarantee the Association against being “held up,” as it had been on some former occasions. He thought it was the duty of the committee to make a recommendation, and that it had no right to shift the responsibility on the Association.

The Chair thereupon put the vote on the motion of Mr. Ford to return the report to the committee, with instructions to make a recommendation, and it carried. Thereupon the Chair called upon Mr. Sayre to make a definite recommendation as to time and place of next meeting.

Mr. Sayre said he wished to say that the Committee felt at the time it made its report that it was best not to prejudice the Association by stating any preference, but now that the Committee had been instructed to make such a recommendation, they were prepared to recommend the city of New Orleans as the place of next meeting, and the time as sometime during the month of May.

Mr. Hallberg moved to substitute Boston, Massachusetts, for the recom-

mendation of the Committee, and this motion was seconded by Mr. C. Caspari, Jr., and others.

Mr. Hynson offered as a substitute to Mr. Hallberg's motion that New Orleans, Louisiana; Boston, Massachusetts, and Cedar Point, Ohio, be voted upon, and that the vote be taken by ballot.

Mr. Taylor, of New York, asked how long it had been since the Association had met in Boston and in New Orleans, respectively, and also how long since it had met at Cedar Point. The Secretary replied that the Association had not met in Boston since 1875, thirty-five years ago, and that the last meeting in New Orleans was in 1891. He said it had never met at Cedar Point.

Mr. Patch, of Boston, asked if the Association had not also met in Boston in 1892, but the Secretary said it had not, that the meeting that year was at the Profile House, in New Hampshire, and that the members of the Association went through Boston on the way to the meeting, and were quite royally entertained by the pharmacists of Boston.

Mr. J. M. Good, of St. Louis, said it would take a good deal of time to decide this matter by ballot, and suggested a rising vote instead, and Mr. Hynson accepted the suggestion.

Mr. E. Berger, of Tampa, Florida, took occasion here to remind the members that an invitation had been extended the Association last year, at Los Angeles, to meet in Florida this year, and he wanted at this time to renew that invitation, and in that connection would state that the chief products of his State were oranges and cigars, and both would be free to all whenever the Association came to Florida. He asked that Tampa, Florida, be included in the list of places to be voted for, and the Chair said this would be done.

The Chair thereupon put the vote upon the motion to proceed to an election between the four places named, and it was carried.

Mr. Payne, of Georgia, here asked if it would not be proper at this point to give the members an opportunity to express their reasons for asking the Association to meet at the places of their choice.

Mr. Leo Eliel, of Indiana, asked to be permitted to say a few words here, and he wanted to make this point: That in 1907 the Association met in the City of New York, a very expensive place for the majority of those engaged in the retail drug business; that in 1908 it met at Hot Springs, Arkansas, another very remote point, expensive to reach, and taking a great deal of time of the members. In 1909, he said, the Association met at Los Angeles, California, a point which was beyond the reach of the majority of the members of the Association, who usually attend its meetings. In 1910, the meeting was here at Richmond, "another extreme point." He said he thought the average pharmacist who attends these meetings should have some consideration shown him when the Association came to select a meeting-place for 1911. He thought the most

of those engaged in the practice of pharmacy were interested in having it at a time when they needed a vacation, and he did not think they needed a vacation in the month of May. The reason of the meeting at Richmond at this time was because the U. S. Pharmacopœial Convention at Washington City was to follow immediately, to which convention many of those in attendance here were delegates. There would be nothing of that kind in May next year, however, and the time that the druggist needs a vacation is in August or September, that being the time when they are worn out by the hot weather of summer and the summer work; and a great many who are accustomed to attend and are interested in the work of the American Pharmaceutical Association are in the habit of postponing their vacation until the meeting of the Association. He also urged that the Association go to some point where it would not be necessary for the average pharmacist to "mortgage his store" in order to meet the rates exacted by the railroad companies and the hotels. Mr. Eliel also urged that the Association should select some place where it could do its work well, and be of some service in carrying out the work the Association was engaged in—some place where, when the members had gone to the meeting and returned, they could feel that they had done some good to the Association, and had received some good from the Association, and had their rest besides.

Mr. Mason, of Detroit, reminded the convention that it was now after 1 o'clock, and there was still much business to be transacted this morning. He thought most of the members were prepared to vote on this question, and he believed that the majority should rule; that discussions should be limited to twenty minutes, and that no one should be allowed more than three minutes in advocating the place of his choice.

There were calls of "Question!" and the Chair put the motion to a vote and it was carried.

Mr. Diehl, of Louisville, moved that the four places in nomination for the meeting place next year be taken one at a time and voted upon, and this suggestion was adopted when it came to a vote.

Thereupon, Mr. F. C. Godbold spoke in advocacy of the claims of New Orleans as the place of meeting in 1911, and the cause of New Orleans was also championed by Messrs. George F. Payne, of Atlanta, and Philip Asher, of New Orleans.

The cause of Boston was championed by Mr. W. C. Alpers, of New York City, and he was supported by Messrs. E. L. Patch, of Boston; C. S. N. Hallberg, of Chicago; C. H. Packard, of Boston, and C. Lewis Diehl, of Louisville.

Cedar Point, Ohio, was championed by Theodore Wetterstroem, of Cincinnati, and the claims of that resort were also advocated by Messrs. Leo Eliel, of South Bend, Indiana; H. T. Hynson, of Baltimore; W. W. Bowman, of Toledo; W. L. Dewoody, of Arkansas, and H. L. Taylor, of Albany, New York.

Mr. Berger put in a good word for Tampa, although he said they did not hope to secure the meeting of the Association there for next year, as they were so close to New Orleans, and he would not ask it; but that they hoped to have the Association at Tampa within the next few years.

The Chair stated that the points to be voted upon, then, were New Orleans, Boston and Cedar Point, and called on all those in favor of New Orleans to rise and stand while the Secretary counted them. This procedure was carried out, and the Secretary announced that New Orleans had received 26 votes. Boston was the next point voted upon in the same way, and the Secretary announced that Boston had received 59 votes. Cedar Point was next, and received 38 votes.

Mr. Payne, of Georgia, moved that as Boston had received 59 votes, a plurality of the votes cast, that Boston be declared the unanimous choice of the Association for its place of meeting in 1911, and this motion was seconded by Mr. Godbold, of New Orleans—who said he thought that all the members should pledge themselves to be at Boston—and was carried unanimously.

The Chair called for the action of the Association as to the time of next meeting, and on motion of Mr. Hynson, of Baltimore, this matter was referred to the Council.

The Chair made announcement that the railway tickets of members which had been deposited for validation were now ready to be returned to them, and could be had at the Local Secretary's desk. He also made an announcement of simultaneous meetings of the Commercial and Scientific Sections at 3 o'clock this afternoon.

On motion, the Association stood adjourned, to meet at call of the Chair.

FOURTH SESSION—WEDNESDAY AFTERNOON, MAY 4, 1910.

No business was transacted by the Association previous to the second session of the Section on Scientific Papers and the adjourned session of the Section on Commercial Interests.

FIFTH SESSION—THURSDAY MORNING, MAY 5, 1910.

No business was transacted previous to the first session of the Section on Education and Legislation and the first adjourned session of the Section on Scientific Papers.

ADJOURNED (SIXTH) SESSION—THURSDAY MORNING, MAY 5, 1910.

An adjourned session of the second general session was held at call of the President on Thursday morning, immediately following the first session of the Section on Education and Legislation, President Rusby presiding.

The Chair stated that as this was an adjourned session the minutes of the second general session would not be read, nor would the minutes of the Council be read.

The Chair stated that the first order of business would be the appointment of the Committee on Pharmaceutical Syllabus, provided for by the amendment to the By-Laws at Wednesday morning's session, and he would appoint the following on that Committee :

For 7 years, Willis G. Gregory, Buffalo, New York.

For 6 years, C. S. N. Hallberg, Chicago, Ill.

For 5 years, Geo. M. Beringer, Camden, N. J.

For 4 years, Harry B. Mason, Detroit, Mich.

For 3 years, Eugene G. Eberle, Dallas, Texas.

For 2 years, Charles Caspari, Jr., Baltimore, Md.

For 1 year, Henry L. Taylor, Albany, N. Y.

The Chair announced a meeting of the Syllabus Committee at 8 o'clock this evening, if it was possible for its members to get together.

The Secretary was here given opportunity to read several communications which he had received, and he stated he had three telegrams which had arrived since yesterday, in reply to telegrams sent by him by direction of the Association. The first was from Baltimore, which read as follows :

BALTIMORE, MD., *May 4, 1910.*

CHAS. CASPARI, JR., *Jefferson*, Richmond, Va.

Reciprocate fraternal greetings, regret I cannot be with you.

CHARLES E. DOHMF.

The second was from Dean Wulling, of Minneapolis, as follows :

MINNEAPOLIS, MINN., *May 4, 1910.*

CHAS. CASPARI, JR., *Secretary American Pharmaceutical Association, Hotel Jefferson, Richmond, Va.*

Gratefully appreciate sympathy, heartiest greetings and best wishes, successful meeting.

FRED'K J. WULLING.

The Secretary then read the following telegram from ex-President Oscar Oldberg, of Chicago, now sojourning in California for the benefit of his health :

LA JOLLA, CAL., *May 4, 1910.*

CHARLES CASPARI, JR., *General Secretary American Pharmaceutical Association, Richmond, Va.*

Heartiest thanks to officers and members for remembering your absent brother, although temporarily separated by thousands of miles we stand firmly together in our devotion to true pharmacy.

OSCAR OLDBERG.

The Secretary read the following communication from Mr. Geo. M. Beringer, offering his resignation as a member of the Committee on U. S. Pharmacopœia :

To the Officers and Members of the American Pharmaceutical Association:

Gentlemen: In conjunction with the report of the Committee on U. S. P., I herewith present my resignation as a member of the Committee, and urge that this be immediately accepted, and the vacancies existing be promptly filled so that the Committee may be reorganized before leaving Richmond and the work be continued without interruption.

Yours fraternally,

GEORGE M. BERINGER.

The Chair stated that it was with the greatest regret that he heard this resignation presented. He said he did not think any member of this Association since his connection with it had done more faithful, more efficient work or harder work than Mr. Beringer had done as Chairman of that Committee, and that all must appreciate the time and labor he had given to it, and the only reason he would advise not to promptly decline his resignation was because of Mr. Beringer's statement that he could not afford to give the time to it, and the Association did not want to be unjust. He said he was sure that the Association appreciated the work that Mr. Beringer had done more than he could express. (Applause.)

Mr. Motter, of Washington City, moved that the thanks of the Association be returned to Mr. Beringer for his excellent work on this committee, with the assurance that the Association regretted exceedingly that the necessity of his devoting more attention to his private affairs impelled him to take this step.

This motion was seconded by Mr. Raubenheimer, of Brooklyn, and carried unanimously.

The Chair stated that the new appointment on the committee would be named at the next session.

The Secretary stated that he had just received a telegram which, though it had arrived a little late for the purpose, he thought it was proper to read, as it showed the feeling of the New Orleans people towards the Association. Of course, as the place of meeting next year had been settled on yesterday, this communication was no longer available, except as an expression of kindly feeling. He then read the following:

NEW ORLEANS, LA., May 4, 1910.

CHARLES CASPARI, JR., *Secretary American Pharmaceutical Association, Jefferson Hotel, Richmond, Va.:*

Louisiana Pharmaceutical Association extends fraternal greeting, best wishes successful meeting; earnest desire to have you May, 1911.

C. W. McDUFF, *Secretary.*

The Chair called for the reading of reports of committees as the next order of business, but the Secretary suggested that some of the delegates from the American Medical Association were present, and had with them a communication in regard to the National Formulary. He thought it would be well to call on Doctor Robert A. Hatcher at this time. Thereupon the Chair invited Doctor Hatcher to present his message from the American Medical Association.

Doctor Hatcher submitted the following report on behalf of the committee :

COMMUNICATION FROM THE AMERICAN MEDICAL ASSOCIATION.

The American Medical Association has been requested to co-operate in the revision of the National Formulary, and in pursuance of that request the following committee has been appointed: Hatcher, Howland, Hunt, Kebler and Sollmann. The Chairman of the Section on Pharmacology has appointed a committee with the same membership to co-operate with the Committee of Revision of the National Formulary of the American Pharmaceutical Association.

No specific matter was submitted to the committee, and at present it can only report its attitude towards certain questions of general policy, those of admissions and nomenclature being the most important by far.

The committee believes that the usefulness of the National Formulary to the medical profession depends upon the adoption of standards as high as those which the Council on Pharmacy and Chemistry has set for the admission of proprietary products into New and Non-Official Remedies.

The spirit of Rules 8 and 10 should be observed particularly with reference to articles admitted to the National Formulary.

It should be remembered that Rule 8 requires that the trade name of a pharmaceutical preparation must be so framed as to indicate the most potent ingredients. In order to comply with the spirit of this rule the presence of narcotic drugs should be suggested at least by the title, and a preparation of alkaloids should not be called by the name of the crude drug yielding those alkaloids.

Rule 10 states that no article will be recognized by the Council if the preparation is useless or inimical to the public or the medical profession owing to the unscientific composition of the preparation.

The Council holds that all preparations of doubtful medicinal value, but which tend to encourage the use of alcohol or other habit-forming drugs, are barred by this rule. Examples of this are found in the compound elixir of celery, elixir of sodium bromide and many others which can be replaced by extemporaneous prescriptions without trouble. It is hardly necessary to state that such preparations as the compound elixir, which the Council has condemned unequivocally, are excluded by this rule also.

The foregoing report having been adopted by the Council on Pharmacy and Chemistry without a dissenting voice, the committee hereby tenders its services in compliance with the request made at the meeting of the American Medical Association at Atlantic City in June of last year.

R. H. HATCHER, *Chairman of the N. F. Committee A. M. A.*

Doctor Hatcher stated that this report was made to the Council on Pharmacy and Chemistry, and he read it merely to suggest the attitude of that committee, and to ask the pleasure of the Association in regard to further co-operation, and to indicate the way in which any co-operation might be desired pharmaceutically.

The Chair stated that while he did not wish to discuss this report, he would like very much to direct attention to its great importance. He said that the idea of a national formulary's emanating from one single association of one profession, without any co-operation on the part of the medical profession, was, in his opinion, an absurdity, and one that could never be sustained at law. He said if hearty co-operation could be had

between the professions of pharmacy and medicine in the preparation of the National Formulary, it would at once give it a standing such as it would not have coming from one organization alone. He thought that was a good reason why the Association should welcome this communication from the American Medical Association.

Mr. Beringer moved that this communication be received, with thanks, and referred to the Committee on National Formulary, and that the co-operation of this committee of the American Medical Association be solicited throughout the work of revision. This motion was seconded by Mr. Meissner and others, and carried unanimously.

The Chair stated that reports of committees were now in order, and asked if the Committee on President's Address was ready to make report. Mr. Beal, Chairman of the Committee, answered in the affirmative, and Second Vice-President Johnson was called to the Chair while the committee made its report.

Mr. Beal prefaced the reading of the report by stating that the committee had found, on consideration of the President's Address, such a wealth of material and of ideas that it had felt itself at a great disadvantage, and appreciated that the report made is not in accordance with the character of the address itself, or that it fully covers the many new and original thoughts which were presented in that address. He then presented the report as follows :

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Mr. President : The committee to which was referred the recommendations contained in the President's address respectfully reports as follows :

In the opinion of the committee your President is entitled to the thanks of the Association for the frank and fearless manner in which he has discussed matters which are of vital concern to the Association and to the cause which it represents, irrespective of our agreement or disagreement with the opinions expressed by him.

With respect to the specific recommendations contained in the address we report as follows :

We approve of the recommendations concerning increase in membership in so far as they refer to

1. The creation of a class of members to be known as sustaining members, or by some other appropriate title, the same to be provided for under Rules and By-Laws of the Council and hereafter submitted for the approval of the Association.

2. The establishment of new Branches in districts which are able to maintain them in proper efficiency, and to increase the efficiency and working force of the Branches already established.

3. The authorization of such changes in the character and scope of the "Bulletin" as will justify a reasonable expectation of an increase in its circulation and influence among non-members and make it as far as possible self-sustaining.

The committee does not approve the proposition to use the income from the Ebert legacy prior to the time when the fund and the accumulations thereon shall have reached the gross sum hitherto fixed by resolution of the Council. We therefore recommend that this particular recommendation of the President be sent to the Council for further consideration.

The committee approves of the following recommendations:

4. To increase the working efficiency of the important committees of the Association by such liberal allowances of financial support as the funds of the treasury may now or hereafter warrant.

5. That the Committee on National Legislation be supplemented and strengthened by the addition of sub-committees closely allied with the work of the various State Pharmaceutical Associations.

6. That the work of the Committee on Publicity be supplemented and strengthened by the addition of sub-committees located in the principal centers of population.

7. That the Committee on National Legislation inquire into the desirability and practicability of the establishment of legal requirements for proper educational and technical qualification of those who are directly in charge of the importation and wholesaling of drugs and chemicals, in order that the public health may be more properly safeguarded.

8. The recommendation that all ex-Presidents be made *ex-officio* members of the Council being one which involves an amendment to the fundamental laws of the Association, and a proposition of such far-reaching possibilities, we recommend that it be sent over to the Council for further consideration.

9. We approve of the President's recommendation that all committees and officers having charge of the arrangements for future meetings be instructed to make greater efforts to secure more favorable rates for transportation and hotel accommodations, and that the committee should as far as possible avoid the selection of expensive hotels as headquarters.

10. We approve the recommendation that the Association place itself on record as endorsing the statement contained in the Sixth Revision of the United States Pharmacopoeia, "That it is best to refrain from dropping (from the official list) drugs and preparations which on inquiry are found to be of more than purely local use," and that the primary consideration in determining the official recognition of a medicinal article should be that it or its preparations are of common occurrence in pharmacy rather than mere academic opinions concerning therapeutic value.

11. We also concur in the opinion of the President that the definitions, descriptions and tests of pharmacopoeial articles should be so fully and definitely stated as to insure as far as practicable against the possibility of their misinterpretation, and also that it would be advisable to include in the text of the Pharmacopoeia descriptions of the more important powdered drugs in so far as the inclusion of such description is capable of practical usefulness.

In addition to the specific recommendations sent to this committee for consideration we also find in the President's address various expressions of personal opinion upon questions and policies concerning which reasonable men may justly and honestly differ.

The committee therefore deems the present occasion opportune for the reassertion of the right of every member to the free expression of his personal opinion regarding any question of vital concern to pharmacy or to the welfare of this Association, and also of the fact, founded upon the constitution and long-established Association tradition, that no such assertion of personal opinion, whether of officer or of lay member, can be regarded as reflecting the Association policy regarding such question, unless the same shall have been clearly expressed and ratified by concurrent vote of the Council and general session of the Association in the formal manner provided in the Constitution and By-Laws.

Respectfully submitted,

J. H. REAL,
F. C. GODBOLD,
CASWELL A. MAYO,
CHARLES HOLZHAUER,
HENRY C. BLAIR.

Mr. Beal, in connection with recommendation three of the committee's report, explained that the committee felt that the action of the Council as to the Ebert Legacy, expressed by resolution, was the result of careful and deliberate thought on the part of that body, and that the Association in general session, where there was not sufficient time for a consideration of all the points involved, should hesitate to reverse this action of the Council. Therefore, the committee had reported in favor of referring to the Council this particular recommendation of the President, which should be sufficient notice to the Council that the Association desired it should again give the subject full consideration, and report at some future time.

Mr. Beal stated that, on behalf of the committee, he would like to move that the report be adopted and the committee discharged. Mr. Whelpley seconded this motion.

The Chair called the attention of Mr. Beal to the fact that at the Los Angeles meeting last year the name of the Committee on National and State Legislation was changed to that of Committee on National Legislation only, State legislative matters to be taken care of by the Section on Education and Legislation.

Mr. Beal, in reply to the statement of the chair, said that the Committee had simply followed the nomenclature of the "Bulletin" of the Association, and he was sure there would be no objection to making this change.

President Rusby, from the floor, stated that Mr. Beal was perhaps not in the room a few minutes ago, when the President acknowledged he had made an error in this behalf; that it was his fault, and that he would assume the responsibility for it.

Mr. Beal said that, if there was no objection, he would assume the responsibility of changing the title in the report to correspond to the correct title.

Thereupon, the Chair put the vote on the motion to adopt the report and discharge the committee, and it prevailed.

President Rusby resumed the chair, and stated that he did not know that a President had ever done such a thing before, but in view of certain peculiar conditions existing at this time, with which many of the members were familiar, he wanted to express his gratitude to the committee for the manner in which they had presented their report; that the courtesy and consideration they had shown had won his gratitude, and he hoped the committee would accept his thanks.

Mr. Taylor, of Albany, commented on the failure of the Committee on President's Address to take any action upon the last recommendation made by the President, that the proper academic and professional titles of members be appended to their names in the official directory. Mr. Taylor spoke at length upon the question of degrees and titles, and the inconsistencies and shortcomings of editing rules in general in this country, and moved the appointment of a committee to consider the desirability of

attempting to secure some concerted action in this Association along the line of editing rules.

This motion had a second in Mr. Hynson, of Baltimore.

The Chair said that he understood Mr. Taylor's position to be, that he desired to extend the subject of degrees to the subject of editing rules in general.

Mr. Remington stated that in the pharmacopœial work of the Committee on Revision they had been met with this same difficulty, and he thought it could be easily solved. There is sent to each member of the committee a short notice, stating that it is proposed to put one title after each member's name in the Pharmacopœia, and it is desired to give the member himself an opportunity to say which title he prefers, and he is given the benefit of his title in the Pharmacopœia. The committee had found this a simple and safe rule. The idea is to give a man one title, and give him the privilege of saying what that title shall be.

The motion to appoint a Committee on Editing Rules was put to a vote and carried, and the Chair, a little later in the session, appointed the following as composing that committee, stating at the time that it might look "a little like mixing fire and water," but he believed the various interests should be represented on the committee—the editor of the "Bulletin," the Chairman of the Revision Committee, and the mover of the resolution :

H. L. Taylor, Albany, N. Y.

C. S. N. Hallberg, Chicago, Ill.

Joseph P. Remington, Philadelphia.

The Chair stated that the Committee on Drug Reform had a report to present—a long one—and in order to avoid useless consumption of time, the report being in print, it would be distributed by the Chairman, and he would ask the members to read it over, so that when it came up for discussion on Saturday it would not be necessary to read the report before the convention. He said this report would be presented by Mr. Sayre, its Chairman.

Mr. C. M. Ford, of Denver, stated that, before leaving the subject of the President's Address, he would like to read some resolutions, suggested by the Chairman's Address, and somewhat supplementary of the report of the Committee on President's Address :

RESOLUTIONS.

Resolved, That in the opinion of the American Pharmaceutical Association it is neither wise nor expedient, even in pursuit of schemes which it is claimed will advance the material welfare of dispensing pharmacists, to assail, antagonize or malign any class inseparably joined to us by commercial or professional ties.

Resolved, That we seriously deprecate the hostile attitude towards the medical profession and the jobbing fraternity of various drug journals assuming to represent pharmacists in general, or some considerable body of pharmacists in particular.

Resolved, That we respectfully urge upon the officers of the American Druggists' Syndicate a more careful supervision of the utterances in their so-called organ. Its harsh language is hurtful to pharmacists, and embarrassing in their necessary relations with one another, and with physicians and jobbers. The mercenary schemes of the few over-zealous and adventurous individuals, who being frequently without any training in pharmacy, and who have entered its ranks solely for gain and to exploit their peculiar ideas of high finance, can have no sympathy with its aims or traditions—such schemes can be helpful and profitable to only an insignificant few, and must necessarily bring inevitable disappointment and disaster to the multitude who follow in their train.

Resolved, That we recommend that any movement for the reform of medical practice be allowed to originate and proceed within the medical profession.

Resolved, That we are opposed to any attempt upon the part of the pharmacal press to dictate or compel any such reform, believing as we do that the medical profession is eminently qualified to institute and carry out its own necessary reforms.

Mr. Hallberg seconded the resolutions just offered.

Speaking to his resolutions, Mr. Ford said he recognized that they were not as strong as they might be, to suit the ideas of those who had been thinking strongly on these topics, but he also realized that the position of this Association was a delicate one; that when the President's Address was read and talked over, it was feared that the Association might be betrayed into some expression which was contrary to its ethical ideals, or which might detract somewhat from the dignity and character it had always enjoyed. But the condition of its members throughout the country was a matter that must have consideration now. They certainly had been made to suffer by misrepresentation of the grossest and vilest kind, in certain pharmaceutical literature, and they had to be constantly on the defensive against these papers and utterances, in the attempt to show that they did not apply to the great mass of druggists, but only to the few. Whatever the motive might be, it was wrong to put the druggists of the country in this false attitude, and force them to be constantly trying to square themselves with the medical profession for things said in anger and said without reference to their application to druggists as a class.

Mr. Francis B. Hays, of New York, ventured the prediction that if this question were to come up for discussion there would be a great many members who would take one side or the other, and he, therefore, with all due consideration to his friend Mr. Ford, moved to lay these resolutions on the table. This motion was seconded by Mr. Hynson, of Baltimore.

The Chair put the vote on the motion to lay upon the table, and, on division, the Secretary announced that 32 members had voted in favor of the motion to lay on the table, and 33 against said motion, and the Chair declared the motion lost.

The Chair thereupon put to a *viva voce* vote the motion to adopt the resolutions presented by Mr. Ford, and it carried, and the resolutions were declared adopted.

Mr. Beringer offered the following resolution :

WHEREAS, The American Pharmaceutical Association through its various committees on U. S. Pharmacopœia, National Formulary and Standards for Non-Officials, is engaged in scientific investigations tending to the fixing of correct standards for many drugs, pharmaceutical preparations and chemical products, and

Whereas, A number of our active members, connected with the work of the various departments of the Federal Government, are associated in the work of these committees and have at their command much useful data that should be available and would materially assist in the work of our committees; therefore, be it

Resolved, That the co-operation of the departments of the U. S. Government be solicited, and be it further

Resolved, That a formal request be made by the executive officers of this Association, that such members who are in the Government service be permitted to serve on these committees, and to utilize such scientific and practical information as will aid in our work without being detrimental to the interests of the Government.

Mr. Beringer explained that, by rule of some of the departments, those engaged in the Government Service were permitted to make no disposition of the material which they had gathered and the information obtained, and reminded the Association that of the Committee on U. S. Pharmacopœia of this Association and that on National Formulary for this year twenty per cent. or more of the members were engaged in the Agricultural and other departments of the Government Service, and likewise as to the Committee on Standards of Non-Officials. He said he believed these gentlemen should be permitted to co-operate with the American Pharmaceutical Association in its scientific work, and without this request he did not believe the Association could have the advantage of the valuable information that these gentlemen possessed.

The resolution was promptly adopted.

The Secretary suggested that the report of the Committee on Weights and Measures, Mr. Henry Kraemer, Chairman, might be made at this time, and Mr. Kraemer presented the following report :

REPORT OF COMMITTEE ON WEIGHTS AND MEASURES.

A number of suggestions have been made by the members of the Committee which are in the line of educational propaganda work.

Professor Stevens suggested the preparation of a newsy article on the Metric System showing its simplicity and stating its legalized use for different purposes by the Government, and proposing that such article be sent to a progressive pharmacist in each of our principal cities asking him to send it to the daily newspapers with the request that it be published.

Professor Asher recommended that an article on the Metric System be prepared, showing its advantages from the manufacturing standpoint, and that a copy of the article be sent to every pharmaceutical association, branches of the A. Ph. A., and certain allied associations.

Dr. S. W. Stratton, Director of the United States Bureau of Standards, Department of Commerce and Labor, Washington, D. C., furnished the chairman, at his request, a pamphlet on "The International Metric System of Weights and Measures," which was expressly prepared to answer some of the more simple questions addressed to the Bureau of Standards in regard to the Metric System and its use. This pamphlet gives a concise

history of the Metric System, the names of the countries giving governmental support to the system, a synopsis of the system, and tables and diagrams showing a comparison of Metric and customary units. And it is believed that this pamphlet would furnish an excellent basis for an article intended for educational purposes, whether circulated among pharmacists, physicians or others.

The Bureau of Standards has also gotten out a large chart showing the relation of the three Metric units to one another, and in turn to the customary units employed. This chart would be especially useful in schools of pharmacy and medicine, and in other educational institutions where the subject of weights and measures is taught.

In fact, the chairman is of the opinion that most effective educational work leading to the general approval of the Metric System can be accomplished by getting teachers in the public schools to lay more stress on the advantages of the Metric System, and to give practical exercises using the actual measures and weights. In fact, the question of the adoption of the Metric System universally in the United States could not long be delayed when once the pupils in our schools have learned to actually use metric weights and measures.

It is rather remarkable that, as shown in the pamphlet already referred to, when the use of the Metric System is required in the Medical Departments of the Army and Navy, and in the United States Public Health and Marine Hospital Service, and besides legalized in the Philippine Islands and made obligatory in Porto Rico, there has been adopted in the Senate of the United States a resolution entitled S. J. Res. 37 (Congressional Record, March 11, p. 3121), which is under the consideration of the Committee on Printing. This resolution provides that all documents, papers, etc., published by the government of the United States be printed in the English language and includes provisions that wherever Metric weights and measures, Centigrade thermometer and similar standards are used, the equivalent in the English standard be given.

This resolution scarcely needs other comment than to say that the necessity exists for guarding the progress that has already been made.

A similar back tendency in certain directions is shown by a recent editorial in *American Medicine* (January, 1910, p. 7) on "The Tyranny of the Metric Advocates and French Metric Tyranny." While the percentage of physicians who actually use the Metric System in prescription writing is very small, it is probable that the majority of them recognize its advantages, and hence it may be taken for granted that this editorial will not have any real influence in hindering progress.

As showing what may be done by local branches of the A. Ph. A., attention is called to the action of the Chicago Branch which proposed two resolutions for submission to the National Convention of City Sealers which met in Washington on February 25th. (See A. Ph. A. *Bulletin*, February, 1910.)

A. B. STEVENS,
CHARLES E. CASPARI,
PHILIP ASHER,
JOHN J. BRINTON,
HENRY KRAEMER, *Chairman*.

The following article which has been prepared by Professor Stevens gives succinctly some facts about the Metric System which are not generally known :

Metric weights and measures were legalized in the United States in 1866. They were adopted in 1893 as the fundamental standard by which all other weights and measures are verified.

United States postal rates to foreign countries are based on Metric weights, for which purpose 15 grams shall be considered equivalent to half an ounce.

They are used in the United States Mint. The weight of one dollar is 26.729 grams, the half dollar 12.5 grams, the quarter 6.25 grams and the dime 2.5 grams.

The legal electrical unit is based on the Metric System.

They are required to be used in the work of the Navy and War Departments. Invoices, requisitions, receipts and prescriptions must be written in the Metric System.

Their use is required in the Public Health and Marine Hospital Service for all official, medical and pharmaceutical purposes.

There is no definite relation between the old system of weights and measures. The avoirdupois ounce has 437.5 grains, the apothecaries' ounce has 480 grains, and the fluid ounce of distilled water weighs 455.7 grains. Compare this with the Metric System in which one cubic centimeter of distilled water weighs one gram.

The system is so simple that anyone may become familiar with it in a short time. Like our decimal currency the tables contain terms that are seldom used. In currency dollars and cents are all that is necessary, though the dime is frequently used, mills only occasionally, while eagles and double eagles are almost unheard of.

For metric weights all that are important besides the gram are, the kilogram which is 1000 grams and the milligram which is 0.001 of a gram. The decigram, 0.1 gram, and the centigram, 0.01 gram, are occasionally used. For measures of capacity the cubic centimeter and the liter, which is 1000 cubic centimeters, are all that is necessary. For measures of length the meter is the unit. The kilometer is 1000 meters, the decimeter is 0.1 of a meter, the centimeter is 0.01 of a meter and the millimeter is 0.001 of a meter.

For those who have to use the system all that is necessary is to obtain the required weights or measures and use them where directed. It is stated that a large shop received a contract for a bridge the dimensions of which were in the Metric System. The men at first refused to do the work, but when given metric measures soon became familiar with them, and later acknowledged that they were easier to use than the old system.

A. B. STEVENS.

The Chair stated that this was another report that proved good work, and called for action. On motion of Mr. Sayre, the report was ordered received, and to take the usual course.

In the absence of Mr. Wulling, Mr. Joseph W. England, of the Committee, presented the report of the Chairman of the Committee on "Bulletin," as follows:

REPORT OF THE CHAIRMAN OF THE COMMITTEE ON BULLETIN, A. PH. A.

To the American Pharmaceutical Association:

Gentlemen: The closing year's activities of your Committee have crystallized into the following recommendations, which if adopted and carried out by the Association, would, in the opinion of the committee, greatly add to the efficiency and value of the Association, to its members and to pharmacy at large:

The Committee recommends that

1. The Association establish a monthly journal of proper size and character to take the place of the present "Bulletin."
2. That the title of the journal be "The Journal of the American Pharmaceutical Association."
3. That the scope of the proposed journal include editorials, original articles and proceedings (annual, Council and Branch), and pharmaceutical abstracts (covering the former Report on the Progress of Pharmacy).

4. That only approved papers and advertisements be accepted for publication in the proposed journal.

It has also been proposed by a member of the committee that the editor be the editor-in-chief; the General Secretary an associate editor (to report the Proceedings); and the Reporter on the Progress of Pharmacy an associate editor (to report the pharmaceutical abstracts), the last named to have eight or more assistant editors according to the work to be covered.

The chairman is conscious of the importance and nature of these committee recommendations and, in order to facilitate their discussion by the Association, he appends abstracts from the discussion of the subject by the committee members, who have given the matter much thought and consideration.

The adoption of the first recommendation was unanimous and practically without discussion. The other recommendations were adopted by a majority of the Committee. Abstracts of the Committee discussion follow. In support of the second, third and fourth recommendations, Mr. J. W. England who made them says:

"Personally, I do not favor the recommendation that the Report on the Progress of Pharmacy be issued annually in the form of a bound volume, this volume and the "Bulletin" to take the place of the Proceedings as published heretofore. I believe the journal should report all the activities of the Association work. It is doubtless more convenient to have in one annual bound volume the Report on the Progress of Pharmacy than in twelve parts, but on the other hand there are some very distinct compensating advantages: (1) The subject matter would be much more recent and up to-date and, therefore, much more valuable (some of the matter in the 1908 Proceedings was over one year old when published); (2) By concentrating all the printed matter of the Association in one volume, considerable saving would result to the Association for binding, mailing and express; and (3) The monthly journals would then be sufficiently valuable to induce the members to save and bind them. As it is now, the "Bulletin" duplicates a part of the matter of the Proceedings and is thrown away when the members receive the Proceedings.

"The experience of the American Chemical Society in the publication of their journal and Chemical Abstracts is very suggestive. In size, their Journal and Abstracts are $6\frac{1}{4}'' \times 9''$; our Proceedings and "Bulletin" are $5\frac{3}{4}'' \times 8\frac{3}{4}''$; this is only one-half inch more in width and one-fourth inch longer in the size of the page, but it makes a much better appearing page and gives tabular work better display. The type is 10 and 8 points in both cases with slightly different faces. In 1909, the Journal of the American Chemical Society published 4600 copies, embracing 1482 pages of reading matter or about 128 pages per month at a cost of \$6,314.34; the editor's salary being \$650.00 extra. (Journal of the American Chemical Society, February, 1910, page 20.) The Society publishes also two other journals—Chemical Abstracts issued every two weeks and the Journal of Industrial and Engineering Chemistry issued every month. The annual dues of each member is \$10.00 and he receives all three publications. Formerly, it was \$5.00 and he received only one—the Journal. The receipts from advertisements from all three publications were \$6,551.00, the Journal receiving about one-fourth of this or \$1,600.00.

"If it were possible for the A. Ph. A. to issue a monthly journal of 128 pages, 88 pages of this could be given over to the editorials, original articles read before the Association and its Branches, and the proceedings of the Branches; and the other forty pages to pharmaceutical abstracts. 88 pages for general subjects would probably be sufficient, because a part of the Proceedings is now duplicated in the pages of the "Bulletin." There would probably be at least 32 pages or more available for new matter each month. The yearly number of pages would be 1536.

The Proceedings of the A. Ph. A. for 1908 numbered 1200 pages, of which only 441 pages were occupied by the Report on the Progress of Pharmacy. In 1907-8 the Pro

ceedings cost \$4,244.00 including the salary of the reporter on the Progress of Pharmacy of \$750.00. (Proceedings A. Ph. A. 1908, 467.) The "Bulletin" this year will cost \$2,000.00 including the editor's salary of \$200.00. In other words, we spent \$5,750.00 (\$4,250.00 + \$1,500.00) in 1908 for both publications for about 2000 members—the 2500 members of 1909 will cost easily \$6,250.00, while the American Chemical Society spent for its Journal in 1909, for 55 per cent. of its 4600 (2530), the equivalent of only \$3,465.00. Of course, 2530 copies of the Journal would have cost more than this, because the saving on the smaller number of copies of the Journal would be for work and paper only, and not for composition. The composition would have cost the same for 2530 copies as for 4600 copies. Hence, \$1,000.00 probably should be added to the \$3,465.00 (\$4,465.00), and if to this we add \$1,500.00 for editorial salaries, our publications would cost us practically \$6,000.00; and if \$1,500.00 was secured for advertisements, the gain would be \$1,750.00. This is not unreasonable to believe when we remember that in 1907–8, the binding alone cost \$422.00, and the expressage, etc., was \$502.00, and we would save over half these sums if the Proceedings or the publication were issued monthly and mailed under second class postage. But even if no advertisements were secured and no saving made, the gain to the Association in efficiency of work and in stimulating increased interest among the members would, in my judgment, justify the change.

"I am informed on good authority that, if the American Pharmaceutical Association wishes it, the American Chemical Society might be willing to have its abstractors gather for it abstracts of chemical articles of pharmaceutical interest (Prof. A. B. Stevens, who is the editor of the division of pharmaceutical chemistry, could doubtless advise us along this line). It might be possible, also, for us to make a working arrangement with the Journal of the A. M. A. for medical abstracts of pharmaceutical interest, and possibly with other technical journals in special fields—botany, biology, physiology, etc."

Mr. George M. Beringer says among other things: "I find it is valuable indeed to have before me in the form of annual proceedings the history, discussion, motions and all information relating to committees, duties and matters that have been presented in the form of papers, resolutions, etc., for continual reference. The Proceedings as now published form a continuous history of the A. Ph. A. and all of its activities, and for this particular reason, I hope that the plan of publishing this annual volume of Proceedings will be continued without change."

Mr. C. S. N. Hallberg writes: "Since I am fully convinced that nothing short of a first-class journal will maintain interest in the Association and promote its cause, I am in favor of Mr. England's plan. This year will see most of the members at the annual meeting without having scarcely gleaned the bound report of last year's meeting. There is no use of postponing the time (for beginning the proposed enlarged journal to record all the activities of the Association) except in so far as may be required to compromise with the present year's publication."

Mr. F. W. Meissner in advocating the recommendations made the suggestion to bind a sufficient number of sets of the Journal at the end of each year for such members who desired to purchase bound volumes in preference to saving the monthly numbers and having them bound themselves.

The chairman is convinced that the Association should have one publication in the form of a strong and representative monthly, and possibly later a bi-monthly, journal. A properly conducted Association journal, sufficiently representative and of wide enough scope, is the one essential required to strengthen the Association. The objection to the discontinuance of the Proceedings and report in separate volumes are such as are overcome by the suggestion of Mr. Meissner, to have the Association issue at the end of each year bound volumes of the journal for those who care to have them. Mr. Meissner's suggestion appears to the chairman to be an excellent one, in that it makes

it possible for those who do not care to save and bind the separate numbers of the journal, to procure bound volumes covering the entire activities of the Association at the end of each year, thus making it possible to continue the custom observed by many in the past of adding annual volumes to their library.

FREDERICK J. WULLING, *Chairman*.

Minneapolis, Minn., April 30, 1910.

Mr. England said that the other members of the Committee, except Mr. McElhenie, had had a conference since coming to this meeting, and wished to present the following brief supplementary report :

SUPPLEMENTAL REPORT OF THE COMMITTEE ON BULLETIN.

RICHMOND, VA., *May 4, 1910.*

American Pharmaceutical Association :

Gentlemen : As members of the committee we endorse the report of the Chairman of the Committee on Bulletin submitted, but wish to present certain additional facts and recommendations :

In the first place we are most surprised to find, on investigation, that the expenditures of the American Pharmaceutical Association for its publications have risen year by year. from \$3,895.00 in 1905-06 to \$7,800.00 in 1909-10, an increase of \$3,905.00, or 100 per cent. The increase of membership during the same period has been from 1,868 to 2,500, an increase of only 34 per cent.

EXPENDITURES IN DETAIL OF THE PUBLICATIONS OF THE A. PH. A.

	<i>Proceedings Cost.</i>	<i>Bulletin Cost.</i>
1905-06 (Proceedings 1906), membership, 1,868..	\$3,347.95	\$547.49
1906-07 (Proceedings 1907), membership, 2,070..	4,209.76	1,450.20
1907-08 (Proceedings 1908), membership, 2,151..	4,244.62	1,309.30
1908-09 (Proceedings 1909), membership, 2,200..	4,729.39	1,623.91
1909-10 (Proceedings 1910), membership, 2,500..	5,300.00	1,850.00 (9 issues). 2,500.00 (12 issues).
Expenditures 1905-06	\$3,895.00	
Expenditures 1909-10	7,800.00	
<hr/>		
Increase in five years	\$3,905.00, or 100 per cent. increase.	
Members 1905-06	1,869,	
Members 1909-10	2,500,	or about 34 per cent. increase.

The seriousness of the situation becomes apparent when we realize that our membership dues, to-day, are not sufficient to pay our yearly expenses. Hence it is very evident that retrenchment of expenses should be made, if at all possible, and if we can issue our publications at a less expense than formerly, as we believe, and are prepared to show can be done, we feel that it is our imperative duty to do so.

We have gone very carefully into the question of the expense of issuing a monthly Journal along the lines proposed, and from bids obtained from reliable printers, find that it would be readily possible to issue such a Journal for much less money than our present publications now cost us, probably for several thousand dollars a year less. We now spend \$7,800 a year for our publications, and for a much less expenditure, we could do the same work in the form of a monthly Journal, and could do it much better.

Our Journal would then go, every month, to the rank and file of our membership, inspire attention and interest, and promote more general and aggressive work. Such a Journal could be made a power in the land for good to every legitimate pharmaceutical

interest. In our judgment, the American Pharmaceutical Association will never command the influence it could or should until it has an official organ of its own, analogous, for example, to the Journal of the American Medical Association. Before this latter association had its own official organ, its membership was small, and its influence limited. Since the establishment of its Journal, it has grown in membership by leaps and bounds, and its influence has become potential.

What is true of the American Medical Association is true also of pharmaceutical organizations generally abroad; they all have their own official organs, and they exert a wide influence.

If the American Pharmaceutical Association looks with favor upon the establishment of a monthly Journal, we would recommend that the subject be referred to the Council with power to act, to arrange all details as to the issuance of the Journal, including election of editors, etc.

We have not mentioned the matter of advertisements for the Journal, but we believe that sufficient advertisements of the proper character could be obtained to make the Journal in time practically self-supporting. Then the money received from dues, and used to pay the expenses of these publications, could be used for other purposes which would markedly increase the work of the Association, and extend its influence.

(Signed)

J. W. ENGLAND, *Acting Chairman*,
GEO. M. BERINGER,
C. S. N. HALLBERG,
F. W. MEISSNER, JR.

Mr. Beal moved that this very excellent report be referred to the Council, with power to act in the premises, and this motion was seconded by Mr. Asher and carried without dissent.

The Secretary read the following telegram addressed to Philip Asher, of New Orleans, asking the endorsement of this Association of New Orleans as the proper site for the World's Panama Exposition, to be held in 1915:

NEW ORLEANS, LOUISIANA, 5-4-1910.

PHILIP ASHER, J. H., *Care of Convention of American Pharmaceutical Association:*

You are earnestly requested to secure adoption of resolutions by the Pharmaceutical Association endorsing New Orleans as logical point for World's Panama Exposition.

NORMAN WALKER, *Chairman Convention Committee.*

On motion of Mr. Hays, this matter was referred to the Council.

This concluded the business of the Association at this session, and an adjournment was had, subject to call of the President.

SEVENTH SESSION—THURSDAY AFTERNOON, MAY 5, 1910.

No business was transacted by the Association previous to the second session of the Section on Education and Legislation and the second adjourned session of the Section on Scientific Papers.

EIGHTH SESSION—FRIDAY MORNING, MAY 6, 1910.

No business was transacted previous to a joint session of the Section on Education and Legislation with the Boards of Pharmacy and Pharmaceutical Faculties.

NINTH SESSION—FRIDAY AFTERNOON, MAY 6, 1910.

No business was transacted by the Association previous to the first session of the Section on Practical Pharmacy and Dispensing.

TENTH SESSION—FRIDAY EVENING, MAY 6, 1910.

No business was transacted by the Association previous to the second session of the Section on Practical Pharmacy and Dispensing.

ELEVENTH SESSION—SATURDAY MORNING, MAY 7, 1910.

No business was transacted by the Association previous to the third session of the Section on Practical Pharmacy and Dispensing and the first (and only) session of the Section on Historical Pharmacy.

TWELFTH SESSION—SATURDAY AFTERNOON, MAY 7, 1910.

President Rusby called the Association to order in final session at 3 o'clock p. m., and called for the reading of minutes of the second general session as the first order of business. The Secretary read the minutes of the session held Wednesday morning, May 4th, and also the minutes of an adjourned session of the second general session, held Thursday morning. The Chair asked if there were any corrections of the minutes to be made, but none were offered, and they were declared approved as read.

The reading of the minutes of the Council was called for as the next order of business, and Secretary England read the minutes of the fifth session, held on May 5, 1910.

MINUTES OF THE FIFTH SESSION OF THE COUNCIL.

The fifth session of the Council was held May 5, 1910, at 9 a. m, Chairman Godbold presiding. Present: Messrs. Godbold, Eliel, Day, Asher, C. Caspari, Jr., Whelpley, Hunsberger, Scoville, LaPierre, Rusby, Raubenheimer, Motter, White, Eberle and England.

The minutes of the previous meeting were read and approved.

Applicants for membership Nos. 208 to 213, inclusive, were elected.

Mr. Scoville suggested that the Association have official numbered buttons, in lieu of the annual local badge, for members who attend the annual meeting.

The suggestion was adopted, and the General Secretary was directed to so inform the Local Secretary.

Moved by Mr. Whelpley, seconded by Mr. Hallberg, that the time of the annual meeting of 1911 be from August 14th to 18th, inclusive. Carried.

On motion of Mr. Whelpley, seconded by Mr. LaPierre, C. Herbert Packard, of Boston, was elected Local Secretary for the annual meeting of 1911, and the Local Secretary was made Chairman of the Committee on Arrangements, with power to select associates.

Chas. Caspari, Jr., proposed, seconded by Mr. Whelpley, that the Historian of the Association be made a member of the Council *ex-officio*, and submitted the following amendment to the by-laws, which was agreed to:

Amend Article II, Chapter VII, by deleting the word "and" in the third line and inserting the words, "the Historian of the Association," after the word "Council" in the same line.

Charles Caspari, Jr., spoke upon the subject of the complimentary distribution of the Proceedings of the Association to schools of pharmacy.

Mr. Raubenheimer moved, seconded by Mr. England, that back numbers of the Proceedings shall be supplied to schools of pharmacy only on the payment of the regular prices. Carried.

Mr. Motter requested that the name of the Motter Prize Fund be changed to the College Prize Fund. Agreed to.

Secretary England also read the minutes of the sixth session of the Council, held May 6th, as follows:

MINUTES OF THE SIXTH SESSION OF THE COUNCIL.

The sixth session of the Council was held May 6, 1910, at 9 a. m., Chairman Godbold presiding. Present: Messrs. Godbold, Raubenheimer, Charles Caspari, Jr., Beringer, Whelpley, C. E. Caspari, Koch, Meissner, LaWall, White, Eliel, Day, Asher, LaPierre.

The minutes of the previous meeting were read and approved.

Applications for membership Nos. 214 and 215 were favorably acted upon.

The report of the Committee on Reorganization to the Council was presented as follows;

To the Council of the American Pharmaceutical Association.

The members of the Committee on Reorganization have considered the various recommendations in the very able address by President Oldberg, presented at the last annual meeting of this Association, which was, on motion, referred to your honorable body with the recommendation that it be referred to the Committee on Reorganization.

Your Committee would respectfully submit the following suggestions for your further consideration:

1. *Our Publications.*—A rearrangement of the present publications would appear to be desired in view of the fact that many items are now published both in the "Bulletin" and in the annual volume of Proceedings, thus entailing an unnecessary expenditure of money.

2. *Committees.*—We endorse the criticism regarding the need for revising the number and the status of the Committees of this Association, and agree with him in the recommendation that the several Committees should be appointed by the Council, that they be required to report directly to the Council and that such reports as require additional discussion be referred to one or the other of the Sections of this Association for further discussion. Such a procedure would relieve the general sessions of the Association of a tremendous amount of routine work and would insure more careful consideration of the recommendations embodied in the reports of the several Committees.

We also recommend that the Council consider the desirability of rearranging or revising the Committees of this Association so as to avoid, as much as possible, unnecessary duplication by arranging for cooperation on the part of the several Committees.

3. *Selection of our Officers.*—The criticisms offered, while in a measure justified, hardly warrant the recommendation of a change in the method of our nominating candidates.

for offices, and your Committee would, therefore, recommend that the present system of nomination with election by mail be given a further trial, but that such election take place within three months of the annual meeting at which such officers are installed.

4. *Suggestions Regarding our Constitution and By-Laws.*—Your Committee would submit the following report on the several recommendations:

Constitution.

Art. I of the Constitution as it now reads appears to be sufficiently clear to set forth the object of the Association.

Art. III. Your Committee believes that the recommendations regarding a change in the method of preparing abstracts on the Progress of Pharmacy if expedient at the present time would be desirable.

By-Laws.

Chap. 1, Art. II. Change so as to read, "The names are to be submitted by the General Secretary by mail 'three months prior to the date of the annual meeting,' and return the same 'within two months prior to the date of said annual meeting.'"

Chap. 1, Art. V. The repetition pointed out as being embodied in this article can do no harm, as it emphasizes a fact. The editor should be included.

Chap. 2, Art. IX. The recommendation that the President should be required to discuss questions bearing on the affairs of the Association is desirable, when expedient, and the article should be changed so as to read, "He shall present an address on the affairs of the Association" and events of the year, or discuss, etc.

Chap. 4, Art. II. The duties of the Local Secretary are sufficiently well defined in this article as it now appears.

Chap. 5, Art. III. Your committee agrees with the suggestion that it is neither expedient nor wise to continue the publication of the names of members dropped for non-payment of dues; also that the last words, "for three years," should be deleted.

Chap. 6, Arts. II, III and IV. We agree that these articles are in need of revision.

Chap. 7, Art. II. We do not agree with the suggestion that the Council, as now constituted, is too large to transact the ordinary routine business of this Association promptly. The business of this Association should be transacted by the Council, in the interval of the meetings, by the systematic presentation of motions, their discussion and the publication of the resulting vote in the "Bulletin."

Art. III. We agree with the recommendation that Section chairmen should not be members of the Council. The Section should, however, be represented in Council by a special delegate or vice chairman. We would therefore recommend that Art. III be made to read, "The President, Vice-President, General Secretary, Local Secretary, Treasurer, Reporter on Progress of Pharmacy, Editor of the 'Bulletin,' the Vice-Chairmen of the Sections of the Association and the Secretary of the Council shall be ex-officio members of the Council."

A corresponding change should, of course, be made in the list of officers of the Sections so as to provide for one delegate to the Council or one vice-chairman of each Section to be elected annually.

Chap. 7, Art. VIII, should be revised as suggested.

The latter recommendation, however, that Local Branches should have the power to elect members, is not practical at this time.

Chap. 7, Art. VIII, Sec. 3. This is not practicable, since it refers only to candidates to whom objection has been made.

Chap. 8, Art. I. This article needs no reconstruction.

Chap. 8, Art. III, has been recommended for revision in the report of this committee.

Chap. 9, Art. XIII, Sec. 7. The provision, as it now stands, can do no harm, and is an incentive for members to become interested in the Association.

Chap. 10, Art. I. We agree with President Oldberg that it needs revision, as do the other articles of the chapter relating to the election of officers. There should be more uniformity in the number, duties and responsibilities of the officers of the several Sections. We do not concur in the suggestion that a committee of the A. Ph. A. should not propose programs of business to other Associations, and think it rather desirable that such a practice be continued and, if possible, be elaborated on so as to bring the work of this Association in correlation with the work of the several State and Local Associations.

E. G. EBERLE,

M. I. WILBERT,

C. S. N. HALLBERG, *Chairman*.

The report of the Committee on Reorganization,* read at the second general session and referred by the Association to the Council for consideration and action, was presented and discussed.

On motion of Mr. Caspari, seconded by Mr. Eliel, the reports were referred to a committee of five, to be appointed by the Chairman, to present in a concrete form, the proposed amendments to the constitution and by-laws, the committee to report at the next annual meeting of the Association.

Moved by Mr. Whelpley, seconded by Mr. Caspari, and carried, that the consideration of the issuance of the A. Ph. A. Journal proposed by the Committee on "Bulletin," † and referred to the Council by the Association with power to act, be made the special order of business for Saturday, 8 a. m.

The report of the Committee on Unofficial Standards was made by Chairman Beringer, as follows:

REPORT OF THE COMMITTEE ON UNOFFICIAL STANDARDS.

The selection of this committee by the Council was only completed late in January, 1910, and in the short period intervening but little more than the preliminary outlining of the work could be accomplished. In addition to the voluminous personal correspondence between the members, six bulletins (copies accompany) have been issued, circulating to the members the views held on matters referred to the committee, the selection of articles to be standardized, and the preparation of tentative standards for some of these, and rules and regulations to be followed in the discharge of our duty.

A meeting of the committee has also been held at Richmond, and as a result of that conference our views have been crystallized along distinct lines of action.

RECIPE BOOK.

The question of the proposed recipe book referred to this committee has received consideration, and we are of the opinion that it is not expedient at this time to compile a recipe book.

It is the sense of the committee that for some time to come their efforts should be restricted to establishing correct standards for samples, and this voluminous undertaking will require all the activity of the committee.

More than fifty articles have already been selected by the committee for early consideration and standardizing, and assignments have been accepted for a number of these, and outlines for the proposed standards are being prepared.

The Committee on National Formulary has formally requested that this committee assist and cooperate in the preparation of standards for such drugs and chemicals as will be directed in the formulas, and for which there are no standards in the U. S. Pharma-

* See page 483.

† See report of the Committee on the "Bulletin," page 506.

copœia. The importance and urgency of this work is so apparent that the Committee on Unofficial Standards have decided to give it immediate attention.

The committee have determined that their standards shall not be merely academic descriptions based on the text-books alone, but that in each case the referee shall be empowered to obtain information and assistance from all available sources, and that a number of pure commercial samples of the article shall be examined, and upon such information and determinations shall be based the definition, description and tests for identity and purity that will be fair, correct and proper for legal standards.

It is apparent that the work of this Committee will entail considerable expense, and that the members should not be compelled to bear this personally. It is, therefore, recommended that an initiatory appropriation of \$150.00 be made by the Council for the purposes of this Committee, and that all bills properly approved by the chairman be paid therefrom in the usual course.

In the absence of pharmacopœial methods for determining the usual analytical data the Committee have agreed to adopt for such work the methods of the Association of Official Agricultural Chemists, as published in Bulletin 107, Bureau of Chemistry, Department of Agriculture.

The Committee have decided to make only one slight modification in the method of transacting the business, as published in the Proceedings of 1909, page 503, namely: that the vote on a motion be called for with the issuance of the bulletin containing the discussion on the motion, and that a majority of the votes cast shall be considered as sufficient for a decision.

The pressure of other business has compelled Mr. George B. Kauffman to ask to be relieved from the service. In presenting this resignation the Committee deem it advisable to direct the attention to the fact that the work assigned us is an arduous task, calling for continuous, intelligent and energetic application, and the composition of the Committee, therefore, should be comparatively permanent, and the complement should be completed at an early date. There is now special need for members who have devoted considerable attention to botany and pharmacognosy, and it is requested that in the filling of these vacancies this need be considered. The names of the following members are suggested as probably available for such appointments: William Mansfield, Edwin L. Newcomb, Albert Schneider and C. A. Dye. An early designation of the appointments and of the chairman for the year should be made, so that the work can be continued with little or no interruption.

The Council on Pharmacy and Chemistry of the American Medical Association has transmitted to your Committee the following resolutions:

WHEREAS, The American Pharmaceutical Association has appointed a standing committee to provide standards of identity and purity of unofficial drugs and chemicals, and

WHEREAS, This Council has for some time been engaged in the establishment of standards for those medicinal substances which, although unofficial, appear to possess some therapeutic value, and

WHEREAS, It is desirable that standards adopted by the Council and the Committee of the American Pharmaceutical Association should be in accord with each other as far as practicable.

Be it resolved, That the Council offer its cooperation to said Committee, and

Be it further resolved, That the said Committee be requested to examine and criticise the standards for unofficial non proprietary articles, so far adopted, and

Be it further resolved, That in the adoption of further standards for unofficial non-proprietary articles the available standards of said Committee be adopted, so far as practicable.

Your Committee is pleased to acknowledge this communication, and we appreciate the wish and the proffer of cooperation in the making of uniform standards, and have

reciprocated, and will coöperate in every way, and our outlines of proposed standards will be submitted for approval by the Council on Pharmacy and Chemistry, and their standards will be critically examined and adopted wherever possible.

Respectfully submitted,

THOS. P. COOK,
L. F. KEBLER,
GEO. M. BERINGER,
H. KRAEMER,
E. H. LADISH,
CHAS. H. LA WALL,
GEO. D. ROSENGARTEN,

CHAS. E. VANDERKLEED,
J. A. KOCH,
W. A. PUCKNER,
O. RAUBENHEIMER,
M. I. WILBERT.
CHAS. E. CASPARI.

On motion of Mr. Rusby, seconded by Mr. Meissner, the report was accepted and the recommendations adopted, except that the term "pure commercial," used in the report, was changed to "pure."

On motion of Mr. Rusby, seconded by Mr. Hallberg, it was decided to reimburse Mr. Beringer as Chairman of the Committee on Unofficial Standards \$45 for cost of rotary mimeograph used for work of the Committee.

Mr. Whelpley moved, seconded by Mr. C. E. Caspari, that the action of the Association in prohibiting advertisements on programs and in meeting rooms be made a General Rule. Carried.

On motion of Mr. Whelpley, seconded by the General Secretary the action of the Association in turning over the records of the Association to the Historian was made a General Rule.

Mr. Whelpley moved, seconded by Mr. Hallberg, that D. M. Rand, of Portland, Me., be presented with a copy of the 1906-7 Proceedings on payment of dues to date. Carried.

Moved by Mr. Rusby, seconded by Mr. Hallberg, that the Association endorse the holding of the Panama Exposition in New Orleans in 1915. Carried.

ORGANIZATION OF COUNCIL OF 1910-1911.

The Council of 1910-11 was organized on May 6, 1910, at 11 a. m., Mr. Godbold acting as temporary Chairman.

The following officers were nominated and elected for the year 1910-11:

Chairman—James H. Bral.

Vice Chairman—Henry H. Rusby.

Secretary—J. W. England.

On motion duly seconded the following officers of the Association were elected for the year 1910-1911:

Treasurer—Henry M. Whelpley.

General Secretary—Charles Caspari, Jr.

Reporter on the Progress of Pharmacy—C. Lewis Diehl.

Honorary President—Ewen McIntyre.

Vice Chairman Rusby assumed the Chair, in the absence of the Chairman-elect.

The following Committee on Finance was nominated and elected: J. A. Koch, J. P. Remington and E. H. LaPierre.

Mr. Meissner suggested that, hereafter, all bills, properly endorsed by the General Secretary, shall be sent by the Chairman of the Finance Committee directly to the Treasurer, instead of being returned to the General Secretary to be sent by him to the Treasurer, so as to expedite the payment of bills.

The following Auditing Committee was named: James M. Good, Otto F. Claus and Solomon Boehm.

The Committee on Transportation was elected as follows: C. S. N. Hallberg, Chair-

man; Caswell A. Mayo, Charles G. Merrell, H. M. Whelpley, F. J. Wulling, W. S. Elkin, Jr. Charles M. Ford, John G. Godding, Philip Asher, the General Secretary and the Local Secretary of the Association.

Adjourned to meet Saturday, May 7, 1910, at 8 a. m.

Secretary England next read the minutes of the second session of the new Council of 1910-11, held on May 7th, 1910, as follows:

MINUTES OF THE SECOND SESSION OF THE NEW COUNCIL.

The second session of the Council was held May 7, 1910, at 8:30 a. m., Chairman Beal presiding. Present: Messrs. Beal, Hallberg, Rusby, Day, C. Caspari, Jr., C. E. Caspari, Apple, Asher, White, Whelpley, Koch, Johnson, LaPierre, Beringer, Diehl, Eberle, Lemberger and England.

The minutes of the previous meeting were read and approved.

The reports of the Committee on "Bulletin" were considered.

Recommendation No. 1, regarding the issuance of a monthly journal, was adopted, the first number to be issued July, 1911.

Recommendation No. 2, on the title of the journal (Journal of the American Pharmaceutical Association), was adopted.

Recommendation No. 3, on the scope of the Journal, evoked considerable discussion, and it was resolved that the editorials be limited to synoptical references to the contents of the current Journal, and that on stated questions such expressions be confined to the attitude of the Association, if made at all, or if by special contributors, with their names or initials appended. It was resolved also that the Journal publish a note in each issue that the Association will not hold itself responsible for the expression of opinion of its contributors, and that personalities must be entirely eliminated.

It was decided also that original articles, and the Proceedings of the Association (Annual, Council and Branch), be published in the Journal, together with selections of original articles, including pharmaceutical abstracts, from other journals.

Recommendation No. 4, that only approved papers and advertisements be accepted for publication in the Journal, was adopted.

On motion it was agreed that the Journal be sent to members monthly, and that the Report on the Progress of Pharmacy be issued annually as a *bound* volume at the end of each fiscal year and sent to members also; both publications without charge. In addition those members who notify the General Secretary *at the beginning of each year* may receive a *bound* volume of both the Journal and the Report *at the end of the year*, upon the payment of a price to be fixed by the Committee on Publication. The price of \$1 was suggested, but the exact amount was left to the discretion of the committee.

It was suggested that the editor of the Journal should prepare abstracts of domestic pharmaceutical journals, while the Reporter on the Progress of Pharmacy should confine his reviews to foreign pharmaceutical journals; and that the matter of the pharmaceutical abstracts of the Journal should be kept standing, after publication, so that it could be used also in connection with the foreign abstracts published in the Report at the end of the fiscal year. In this way the whole field of pharmaceutical literature could be reviewed in the annual Report at a minimum cost.

It was resolved the Report on the Progress of Pharmacy include the list of officers, prefatory matter, constitution and by-laws, general rules, roll of members, list of members, etc., of the previous proceedings; and it was decided also that the list of payments of membership dues now published in the Proceedings be *not* published in the new Report.

It was agreed that a standing Committee of nine members be elected annually by the Council to supervise the publications, to take the place of the former Committee on

"Bulletin" and Committee on Publication, this committee to be known as the Committee on Publication. The Committee was directed to prepare proper rules and regulations governing editing, publication and the censoring of advertisements.

It was suggested that the subscription price of the Journal to non-members be made \$3 a year and the Report the same; but this was left to the discretion of the Committee on Publication.

On motion it was decided that the monthly "Bulletin," as now published, be continued until July, 1911, and that the average number of reading pages shall not exceed 48 pages per month.

C. S. N. Hallberg was elected editor-in-chief of the Journal, and Charles Caspari, Jr., and C. Lewis Diehl, associate editors.

C. Lewis Diehl, Reporter on the Progress of Pharmacy, was instructed to prepare a list of the assistant editors he desires for the Report, to report to the Council later.

It was decided that the editor and two associate editors with the Treasurer shall be ex-officio members of the Committee on Publication. The other members elected were: F. J. Wulling, Chairman; G. M. Beringer, M. I. Wilbert, F. W. Meissner and J. L. Lemberger.

Moved by C. Caspari, Jr. seconded by Mr. England, that the editor of the "Bulletin" and the Reporter on the Progress of Pharmacy of the Proceedings each receive an honorarium of two months' salary, due by reason of the overlapping of official and fiscal years.

Applicant for membership No. 216 was elected.

Mr. Rusby moved, seconded by Mr. England, that a Committee be appointed to formulate rules and by-laws for the creation of a class of members to be known as Sustaining Members. Carried.

Chairman Beal named the following as the Committee: H. H. Rusby, Chairman; W. B. Day and F. C. Godbold.

Moved by Mr. Rusby, seconded by Mr. Koch, that hereafter the retiring President of the Association shall become a member of the Council for a period of three years. Carried.

Chairman Beal suggested that an amendment be offered the Association covering the motion adopted.

The following amendment was offered by C. Caspari, Jr., and seconded by Mr. Hallberg:

Amend Rule 5 of General Rules of Finance by striking out everything after the words "shall be kept by him."

Amend Rule 9 by substituting the following for present rule: "Said books, accounts of vouchers, saving bank books and accounts of the same shall be returned to the Treasurer within two weeks of the date of their reception by the Chairman of the Auditing Committee."

Mr. Koch moved, seconded by Mr. Hallberg, that the Council appropriate a sum not exceeding \$125 to cover the traveling expenses of the General Secretary and the Treasurer for this year. Carried.

The Chairman of the Committee on the Beringer Question presented the following resolution to the Council with recommendation for adoption:

"That the Council without endorsing the particular expression or precise language contained in the address of Mr. Beringer upon 'Why the Mann Bill Should be Enacted,' read at the Atlantic City meeting of the American Pharmaceutical Association, hereby expresses its sense of appreciation of the fearless and able manner in which he championed the cause of American pharmacy by opposing the highly unjust and unfair provisions of our patent laws. And it is further the opinion of the Council that Mr. Beringer in his opposition of these laws was actuated by a sincere desire to better existing

conditions with respect to pharmacy, and not by any ulterior motives or by hope of personal profit."

The resolutions were adopted.

The members of the Committee on Unofficial Standards were elected as follows:

For one year: C. A. Dye (to succeed George B. Kauffman, resigned).

For four years: G. M. Beringer, Chairman; A. H. Rusby, C. E. Caspari and J. M. Francis.

On motion it was decided that the Committee on Membership of 1909-10 of the Council be reappointed for 1910-11, with the exception of Mr. Meissner (whose term as a Council member expires), and that Mr. Asher be named to succeed him; and also that C. Herbert Packard be named to succeed Mr. Eberle (who became the President of the Association).

J. W. ENGLAND, *Secretary*.

The Chair stated that there was one feature of the minutes of the Council that it seemed to him it would be well to make a little clearer to the members, and that was the recommendation as to the change in the form of publication of the "Bulletin," which was very sweeping in its character. The proposition now was, to publish in place of the "Bulletin" a "Journal" of the American Pharmaceutical Association, to appear monthly, the pages of which were to be double the size of the present pages of the Proceedings. The members could either save these numbers as issued and have them bound at the end of the year, or not, as they chose. Those members who would give notice to the Secretary at the beginning of the year that they so desired would be entitled, on the payment of a small fee, at the end of the year to a bound volume of the issues of the "Journal," in addition to the copies that they received each month. The "Journal" would contain the various matters of interest to the members as heretofore appearing in the "Bulletin," such as the proceedings of the Association, news of the Branches, etc., and likewise all the papers that were presented before the Association. It would also contain abstracts, from month to month, of current events in pharmacy—something in the nature of the report of the Reporter on the Progress of Pharmacy, but not attempting to make it so complete in the "Journal." In the meanwhile, the Reporter on the Progress of Pharmacy would continue as before to make a complete report on the progress of pharmacy, to be published at the close of the year, the available abstracts as they appeared from month to month in the "Journal" to be kept in type and used at the end of the year, so that the report on the Progress of Pharmacy would be very much as at present, and would be bound separately, and a bound copy given to every member of the Association free of charge. Those members, however, who desired to obtain bound volumes of the "Journal," might, if they chose, have the report on the Progress of Pharmacy bound in with them. The report on the Progress of Pharmacy, properly speaking, would be a separate bound volume at the end of the year, and there would be included in that volume the Constitution, the By-Laws, the Index, List of Members, the prefatory matter now contained

in the Proceedings, and everything in the nature of material that must be referred to. The Chair thought this was a pretty clear statement of what the "Journal" would be, as far as he could give it in a moment or two. He suggested that possibly the newly-elected editor might have something to add to this statement, to make the matter clearer to the members.

Mr. Ford, of Denver, objected to the idea of giving twelve months' advance notice to the Secretary that a bound volume would be wanted at the end of the year, and thought ninety days ought to be ample. It would not be desirable, anyway, to have a great number of extra volumes printed, when it was not known what would be called for to be bound, for this would be a great waste of material.

Mr. Payne, of Georgia, asked if the publication of the "Journal" was to take the place altogether of the publication of the Proceedings—whether the report on the Progress of Pharmacy was to be done away with altogether. The Chair stated that there would be a volume, not of Proceedings, but of all other matter which is now printed regularly every year; the Proceedings themselves would be published in the form of a "Journal," and members would not have to await their publication in book form. Then those who notified the Secretary in advance would get a bound copy of the issues of the "Journal" at the end of the year, and in that way they would get a complete bound copy of the Proceedings and everything together.

Mr. Hynson asked if any action had been taken in regard to advertising in the proposed "Journal." The Chair replied in the affirmative, and said there was to be a Committee of Publication, consisting of four *ex-officio* members and five members who were to be elected—and whose names had been read—and they would have charge of advertising and everything else relating to propriety and policy, in carrying out the instructions of the Council as to the publication of the "Journal."

Mr. C. E. Caspari said he thought there was one point that might be emphasized, and that was, that if members elected to take a bound volume of the "Journal," with the report on the Progress of Pharmacy bound with it, at the end of the year, they would also receive, without any further cost, the "Journal" every month during the year, and they would really get two copies of the "Journal," one in the shape of the monthly issue and the other bound in with the report on the Progress of Pharmacy at the end of the year. That is, they would get the "Journal" as one of the privileges of membership, and the extra bound copy practically at cost.

Mr. Francis, of Detroit, suggested that the proposed change to a page twice the size of the present page would change the character of the entire collection of volumes that the members might already have. The Chair replied that the Council had taken all this into consideration, and it had previously been very carefully thought over by those who had been at

work upon this proposition in the past year; but the Council felt that the success of the "Journal" and the success of the Association would be increased by the fact of having a page of larger size.

Mr. Hallberg said it was an object-lesson to go to the shelves where the volumes of proceedings of the American Medical Association were standing in this form, and beside them see the bound volumes of the *Journal* of the American Medical Association. That it was right at this point where the American Medical Association "woke up" and became the great organization it is to-day. He said it would be found more convenient to the editors to have a larger page, and at the same time the cost was less than to publish the smaller page. So the Council, after thorough discussion, had concluded that the page should be made larger.

The Chair called for action upon the minutes of the Council as read, and on motion of Mr. Lemberger the minutes of the several sessions as read were approved.

At this point the Chair announced the appointment of Mr. J. O. Schlotterbeck, of Ann Arbor, Michigan, as a member of the Committee on U. S. Pharmacopœia, in the place of George M. Beringer, resigned.

The Chair stated that he had been informed that the Section on Scientific papers had asked for the appointment of a Committee on Physiological tests—"a subject of which we are just beginning to learn the importance." He said he did not know whether he would be correct in appointing this Committee, but if any member of the Scientific Section was present, and would so inform him, he would proceed to appoint this committee.

Mr. Wilbert stated that the Section on Scientific Papers had passed a resolution requesting the Association in general session to provide for such a committee, and that the President be empowered to appoint a committee of five, to take into consideration the possibility of coördinating the various methods of standardizing drugs physiologically. He referred to the interesting program on physiological testing that the Section had had on Thursday afternoon, when this matter was threshed out, stating that it was the unanimous opinion of the members that while there was an apparent difference of ideas on this subject, the difference was more apparent than real, and that a committee of experts along this line could do much towards the establishment of standards satisfactory to all.

Mr. Dittmeyer, of West Virginia, moved the adoption of this resolution, and the motion prevailed.

The Chair announced the appointment of the following Committee on Physiological Tests: E. M. Houghton, Chairman, Detroit, Mich.; Reid Hunt, Washington City; H. C. Wood, Jr., Philadelphia; R. A. Hatcher, New York; Charles R. Eckler, Ann Arbor, Mich.

The Chair called for reports of committees as the next business in order.

The following report of the Committee on Transportation was, on motion of the Secretary, read by title and referred for publication :

REPORT OF COMMITTEE ON TRANSPORTATION.

Your committee begs leave to report that on February 2d they applied to the joint passenger associations having authority to make rates asking for a special rate for the occasion of this meeting. Although the application was made thus early and was followed up by letters and telegrams, it was not until April 19 that the Trunk Line Association notified the committee that the roads on the Trunk Line territory would concur in the rate of one and three-fifths fares. Some of the railroads proved willing to circularize the members in their territory without cost to the committee, and in this way members were reminded of the meeting. Owing to the late date at which final action was taken by the Trunk Line and New England Associations the circulars of information were sent out later than they should have been. Your committee hopes to be able to secure even more advertising for the meetings in this way in the future than in the past.

The application of the two cent law in some of the States, Virginia, for instance, makes the rate lower than the one and three-fifths fare now granted to conventions. In fact the concession granted is so slight as not to encourage the members to attend. Better rates can be obtained by traveling in parties of ten, but it is impracticable to travel in this way generally, as we rarely find so many who are willing to keep together throughout the entire trip.

The tourists' agencies offer somewhat better terms than the fare and three-fifths, but these offers are all based on travel on party tickets, which the members will not do except possibly where there is a long journey.

While the committee feel that we should obtain better rates, it sees no available means of influencing the decisions of the railway associations, whose actions are based on the numbers in actual attendance at a meeting. The suggestion of the President that some better rate should be made for members of the same family should be taken up and made the subject of negotiations by the incoming committee. For example, a rate of \$29.60 from New Orleans to Baltimore and return will be in effect from May 7-11. This to the committee appears as showing a great deal of partiality, and ignoring the requests of this body. Your committee knows of several who have not attended this convention, but will attend the one in Washington next week. There is no doubt in the minds of this committee that were more conducive rates made, a much larger attendance at these conventions would be had, and the railroads in turn would derive a fuller benefit thereby.

The committee will be pleased to act on the suggestion of the President as to transferring its records to the incoming committee, and submits copies of correspondence with the railways.

If the Secretary of the Association would have some extra copies of the list of members struck off, and would furnish these to the several members of the committee, their efforts to obtain publicity through the distribution of circulars by the transportation companies would be aided materially.

CASWELL A. MAYO, *Chairman*,
PHILIP ASHER.

The Secretary said that the report of the Committee on Organization of Local Branches was not very long, and might be read if desired.

The Chair said that this was an important report, and he thought it should be read. Mr. Mayo, Chairman of the Committee, presented the report as follows :

REPORT OF THE COMMITTEE ON ORGANIZATION OF BRANCHES.

Your Committee begs leave to report that while active efforts were put forth to effect the organization of a branch in one of the cities, where there seemed an opening for the organization of a branch, those efforts proved unavailing largely because of the existence of local conditions unknown to the committee.

There is a lesson for future committees in our experience. This lesson is that it is unwise for any one not on the ground and thoroughly familiar with local conditions to take the initiative in a move of this kind.

But we still have a field for usefulness for this committee in endeavoring to inspire local members to undertake the work of organization.

A branch has been established at Nashville, Tenn., mainly through the activity of J. O. Burge.

Respectfully submitted,

CASWELL A. MAYO, *Chairman*.

The Chair stated that without objection the report would be received, to take the usual course, and it was so ordered.

The Secretary called for the report of the Committee on National Formulary, and in that connection said he would like to present a special report of the Committee relative to a communication from the American Medical Association, which was referred to the Committee on National Formulary :

To the President and Members of the American Pharmaceutical Association:

After careful consideration of the communication from a Committee on National Formulary of the American Medical Association to this Association, which was referred to this Committee, we have the honor to report as follows :

The Committee on National Formulary of this Association are carrying on the revision of the work in accordance with the principles presented in their report at the annual meeting of 1908, at Hot Springs, Ark., and approved unanimously by the Association.

We are unanimously of the opinion that the coöperation of the medical profession is desirable if it can be secured upon the basis of the principles then adopted.

For the Committee on N. F.,

C. LEWIS DIEHL, *Chairman*.

Richmond, Va., May 7, 1910.

The Chair stated that before anything was done about this matter, he would like to say a word on the subject in behalf of the Association : "We do want coöperation with the medical profession," said the Chair, "but we want it to be coöperation. I think it is proper to say that if any set of persons comes to us claiming that they are ready to coöperate with us, but on condition they are to come in and tell us in advance what we are to do on all subjects, it certainly is not self respecting on our part to allow such suggestions to carry. I do not say that this is the attitude, but it seems as though there is a disposition on the part of the Council on Chemistry and Pharmacy to say to the Association : 'We will coöperate with you on condition that you will allow us to have our way in everything.' And this is simply a very respectful protest—not protest, but presentation of that Committee as to the views of this Association. We have been working on this line very practically ; we have not worked

hastily, but carefully—practically, as well as scientifically; and we are glad to get coöperation: but it cannot be expected that the policy which has governed this Association, and which has been well considered by it, will be dropped or discontinued at a moment's notice, simply because we are invited to do so by somebody who is invited to coöperate with us. I think that is the meaning of that communication."

Mr. Diehl, of Louisville, referring to the communication just read, said he wished to say that there was present at this meeting nearly the entire Committee on National Formulary; that there was but a single member absent, Mr. Hall, of Detroit, who was unable to come. So that the communication from the Committee, as well as the report that he had to read, was the result of a conference practically of the entire Committee, and was practically unanimous.

Mr. Diehl then proceeded to read the following report:

REPORT OF THE COMMITTEE ON NATIONAL FORMULARY.

Less than a year having passed since the last report of the National Formulary Committee to the Association, we herewith present a statement covering that period.

If the present revision of the National Formulary simply demanded a correction of the formulas, the task of your committee might be considered so nearly completed that we could confidently look forward to the appearance in print of a revised edition before the expiration of the present year. It might be possible even to include acceptable formulas for new articles to be admitted into the "Formulary," if the conditions had remained the same as in previous editions. With the advent of the Food and Drugs Act of 1906, however, and the consequent recognition of the N. F. as a national standard under the provisions of this Act, it has become necessary, not alone to exercise the utmost care that the formulas shall be absolutely reliable, but also to introduce descriptions and standards for the ingredients required in the formulas for which none are now given in the U. S. P.

This embraces a long list of articles for which the descriptions necessary to establish their identity and purity must be provided, and it is impossible to estimate how much time will be necessary for this purpose. Moreover, formulas will have to be tried and confirmed for some seventy or more articles accepted by the committee for inclusion in the N. F., the alcohol percentages will have to be determined, in a large number of preparations, and the preparations themselves have to be made under the careful supervision of the committee, all of which will consume time that cannot at present be estimated.

NATIONAL FORMULARY BULLETIN.

One of the grave defects of the method of revision in effect until a few months ago has been the absence of a regular means of communication between the members of the committee. This has been overcome by the issuance of mimeograph "Bulletins." A number of these have been published during the last few months and have made it possible to reach conclusions by discussion and vote on many questions.

The committee would recommend that an appropriation be made for expenses in this connection, already incurred, and to provide means for the continuance of the "Bulletin."

PREPARATION OF SPECIMENS.

Definite action having now been taken upon practically all formulas voted to be retained in the N. F., and with the admissions well in hand, tentative conclusions having

been reached, the time has now come when specimens, in adequate quantity, should be prepared for the purpose of establishing uniformity and for the determination of such standards as may be required, such as alcoholic percent, etc.

The work of the Committee, up to this time, has been carried on, in so far as experimental work is concerned, practically without expense to the Association, through the generosity of the individual members.

The Committee now, however, recommends that there be placed at their disposal for carrying on experimental work, a sum not exceeding one thousand dollars (\$1,000), to be expended under the direction of the General Chairman, in making a line of such preparations as may be found necessary; these preparations becoming the property of the Association, to be preserved and used as a basis of comparison in the work of future revisions.

CO-OPERATION.

It having become necessary, through the present legal status of the book, to establish standards and tests for those "simples" used in the preparations of the National Formulary, for which there are no standards in the U. S. Pharmacopoeia, an additional responsibility and a difficult task has been laid upon your Committee.

Inasmuch as the Association now has a Committee actively engaged in preparing such standards, lest there should be a duplication of work, and also that time might be gained, your Committee has asked for and secured the co-operation of the Committee on Unofficial Standards to assist in the preparation of the standards and tests for those ingredients not described in the U. S. P., but used in the National Formulary.

GENERAL PRINCIPLES.

It may prove of interest to the Association to learn of certain general principles which are governing the present work of revision, these having been adopted by the Committee after thorough discussion.

A. The use of saccharin is to be discouraged and permitted in formulas only where absolutely necessary.

B. The revision is to be based upon the principles laid down in the prefaces of the original and revised editions; *i. e.*, such articles as are largely called for by the physicians are to be admitted, therapeutic activity alone not to determine admission.

C. It is desirable to so construct the formulas that preparations may be made contemporaneously, providing the resulting product is satisfactory. With this purpose in view, fluidextracts may be used.

D. It is not considered wise to make any change in the composition or flavor of the preparations now in the N. F., other than to eliminate absolute faults and to conform to the requirements of the Food and Drugs Act.

E. The admission of four new, low-alcoholic-strength elixirs, is approved.

Compound elixir of cardamom.

Compound elixir of vanillin.

Compound elixir of almond.

Compound elixir of glycyrrhiza.

F. No additional compound spirits of volatile oils are to be admitted. Those already approved are:

Compound spirit of cardamom.

Compound spirit of vanillin.

G. We approve of the lowering of the alcoholic strength of the saline elixirs, now in the N. F., providing there is no change in the flavor.

H. Cudbear and caramel are to be retained as coloring agents, and if feasible their solutions are to be standardized.

The final conclusions of the special committee on this subject have not been reported.

If, however, solutions of these substances, of definite tinctorial value, can be prepared, then these standard solutions may be used in the preparations without the use of color charts.

I. All formulas shall be as free as possible from compound preparations, becoming "independent formulas."

J. Part I of the N. F. shall contain all formulas, including those dismissed from former Pharmacopœias.

The admission into the N. F. of preparations dismissed from the U. S. P. shall be determined in each case by the merits of the individual preparation.

Part II shall contain the descriptions and tests of the simples for which the N. F. provides standards.

K. "Introductory notes" to certain classes of preparations are not considered objectionable and are to be retained in a properly revised form.

L. Where standards, descriptions and tests are practicable for the "simples" and preparations of the N. F., they should be included.

STERILIZATION.

A chapter, outlining methods for sterilization as applied to pharmaceutical practice, is to be introduced in the N. F.

It is believed by your committee that future revisions of the National Formulary should be coincident with the revision of the Pharmacopœia, but, to prevent the possibility of there being conflicting standards in the N. F. and U. S. P., we suggest the placing of a statement in the preface of the N. F. to the effect that if any of the standards adopted by the National Formulary are subsequently included in the Pharmacopœia, the standards of that work shall take precedence over those of the National Formulary.

In closing this report we would ask for the support and co-operation of every member of the Association: with the increased responsibility which legislation has laid upon your committee, the labor has been more than doubled; however, the work is being actively advanced, and we trust will meet with your full approval when concluded.

Respectfully submitted on behalf of your committee,

C. LEWIS DIEHL, *Chairman.*

Richmond, Va., May 5, 1910.

The Chair stated that this was a very important report, and he knew there were members present interested in the subject presented. He invited discussion upon the report and the communication.

Mr. Wilbert said that as a member of the National Formulary Committee he desired to say that other duties had prevented his taking any part in the particular meeting referred to, and he wished to be regarded as dissenting from the answer to the American Medical Association. This was simply a personal feeling on his part, and he did not wish to impose his views on any one else.

Mr. Beringer said that there was a matter in the report that he desired to speak about. He said he thought that the pharmacists should continue to hold out the olive-branch to the medical profession. They want their coöperation, and need it, in the revision of the National Formulary. He thought the trouble was that the gentlemen who conferred with the Committee had an entirely different view-point from that which the practical pharmacist has to assume in his work, and it cannot be assumed that the work will meet the requirements of the pharmacologists who will use the

Formulary from that view point. But the Committee would certainly be only too glad to have the practical coöperation of the American Medical Association, and by no means would the Committee want the impression to go abroad that it had declined or did not desire the coöperation of that Association in its work.

Mr. Beringer then moved that the report of the Committee on National Formulary be adopted. The Chair called attention to the fact that the adoption of the report would carry with it an appropriation of \$1,000.00 for the work of the Committee. The motion to adopt was seconded by Mr. Mayo and Mr. Eberle and carried.

The Chair called for report of the Committee on Status of Pharmacists in the public service of the United States as the next order of business, and Chairman Payne made the following report :

REPORT OF THE COMMITTEE ON THE STATUS OF PHARMACISTS IN THE PUBLIC SERVICE OF THE UNITED STATES.

Mr. President: The Committee on the Status of Pharmacists in the Public Service of the United States make the following report :

We have felt somewhat in a quandary as to how to proceed in our work the present year, in view of the adoption of the report of the Committee on the President's Address at the Los Angeles meeting last year. We believe that the committee itself misconstrued the President's words, and in the rush of business made a report which was intended to be innocuous, but which to some seemed to be "loaded for bear."

To leave everything relating to the status of pharmacists in the public service to the supposed benign and ever-watchful care of the various departments would seem to do away with any further opportunities for substantial work on the part of our committee, would permit matters to lapse back into the unfortunate conditions of the past, and would prevent our urging further needed substantial advancement.

If we cease all further efforts to secure a better standing as professional men in rank and in salary for pharmacists in the various public positions throughout the United States and devote ourselves only "to the elevation of their ability and work," we feel that our usefulness as a committee for advancing the status of pharmacists in the public service will be largely destroyed, and that to use our efforts only "to elevate the ability and work" of brother pharmacists holding public positions would not be conducive to improving their official status nor their appreciation and respect by the general public.

To gain some idea of how our Association felt as a whole on this matter, we wrote a letter to the members of the Association asking that they let us know whether in their opinion the work for the advancement of the rank and pay of pharmacists in the public service should be continued or discontinued. We have already received many hundred replies, and we most heartily thank the whole Association for the prompt, cordial and favorable manner in which it has almost unanimously expressed its desire that such work be continued.

Our work has been retarded by this peculiar condition of affairs. We have felt that the Association wanted us to do things which the report referred to seemed to disapprove, so we wish to be set clear, and offer the following resolution :

Be it Resolved, That in our desire to promote the professional advancement of all public and private pharmacists, we earnestly request of Congress and the Departments that proper commissioned rank and commensurate pay be accorded all pharmacists in the various branches of the public service of the United States.

Respectfully submitted,

GEORGE F. PAYNE, *Chairman.*

The Chair suggested that those who would take the trouble to read carefully the words of ex-president Oldberg in his address of last year, would find that he did not object to an increase in the rank and pay of pharmacists in the government service, but that he did not think the proposition was confined to that, but spoke for a more thorough preparation of pharmacists.

Mr. Hallberg moved the adoption of the report and the accompanying resolutions, and spoke to his motion. He said he was one of those who, last year, had appended his name to the report of the Committee on President's Address, and he confessed that since he had read that part of it more carefully and compared it with the President's Address he felt that the reference in the report of the Committee might be construed to mean that the Association had receded from its long continued position on this question. He held that the Association had done splendid work in promoting the status of pharmacists in the public service, and had met with some degree of success, and he would be the last one to utter a word that could be taken as a reflection on the men in the service; and, since it was never too late to correct a mistake, he wanted to go on record as being in favor of this resolution.

Mr. Wilbert dissented from the resolution as presented by Mr. Payne. He thought that the Chairman, in sending out the inquiries referred to, must have selected persons not familiar with existing conditions, and he was not surprised that he should receive such answer from persons not well advised. He expressed the hope that the adoption of the Chairman's motion would not carry with it an endorsement of the bill now before Congress—a bill which was objectionable to the surgeon general, since it was apparently intended to hamper him, and which was, in his opinion, inimical to the service. He said if the Committee would take the time and trouble to inquire into the work that was being done by pharmacists at the present time, and inquire into the possibilities of the work that could be done by pharmacists by proper coöperation with the heads of the several departments, it would find that it might be pointed out to these heads of departments that a very much wider field of work could be outlined—a field in which they could be much more useful to themselves and the service; and he was sure that the Committee in doing this would be doing themselves justice and the Association a real service, to say nothing of improving the status of the men engaged in that branch of the service. One of the provisions in the bill now pending was, he said, that the men should be given commissions, and while this might seem a desirable thing, there was absolutely no advantage in it. He pointed out that there were other men now engaged in the public health work on the same plane with the pharmacists in this respect, and there was not a man in the service nor a scientist in the country, or anywhere, that did not respect and honor these men, because of the character of their work. He thought

the Association would be going entirely in the wrong direction by following the suggestion made in the report of the Committee.

Mr. Payne thought Mr. Wilbert was clearly out of order, because no reference was made in the proposed resolution as to any action to be taken upon any particular bill before Congress; and he never had, and would not, favor such legislation, unless he fully advised this Association in advance. What he had said about the two bills in Congress was entirely outside of his report, and simply an off hand comment.

The Chair called on the Secretary to re-read the resolution offered by Chairman Payne in connection with the Committee's report, that the members might be fully informed, and he did so. Thereupon the Chair put the vote upon the adoption of the report and the accompanying resolution, and they were duly adopted.

The Special Committee on Editing Rules was here given an opportunity to report, and presented the following:

REPORT OF COMMITTEE ON EDITING RULES.

To the American Pharmaceutical Association:

Gentlemen: This Special Committee on Editing Rules, to which was referred the final recommendation of the President, and another item, respectfully offer the following resolutions, and move their adoption:

1. That the Secretary of the Association be, and hereby is, instructed to append to the names of members in our official directory their preferred title and academic degree.
2. That the publications of the Association be edited for form in conformity with editing rules to be adopted by the committee hereinafter provided.
3. That the committee comprise the workers responsible for the editing for form of the Bulletin, Proceedings, Formulary, Syllabus, and of such other publications, State or National, public or private, as may co-operate with this Association in a movement to secure greater uniformity.
4. That other Associations, State or National, be invited to nominate representatives in the formation of a general Editing Committee.
5. That the special committee be, and is hereby, instructed to bring this matter to the attention of the Pharmacopœial Convention, to the American Medical Association and to the American Chemical Society at the earliest practicable moment.
6. That the suggestions made in the Section on Education and Legislation regarding the form or style of formulas be referred to the respective Committees on the Formulary and Pharmacopœia.

Respectfully submitted,

J. P. REMINGTON,
HENRY L. TAYLOR,
C. S. N. HALLBERG, *Committee.*

The Chair stated that the force of the recommendations of the committee was, first, that the proper titles should be appended to the names of members in the printed list of members. The rest of it, he said, although divided into five parts, amounted simply to this: that a committee is to be appointed for the purpose of conferring with similar committees, by other associations, to see if an agreement cannot be arrived at on this subject.

Mr. Mayo moved that the report be received and the recommendations be adopted, and this motion was duly seconded.

Mr. Mayo, in this connection, said he wanted to say a word in the nature of a correction that he thought should be made. Referring to that part of the President's Address dealing with the subject of titles, and the motive prompting the action of certain members of the Association some years ago when the rule was adopted abolishing the use of titles on the floor of the convention, Mr. Mayo said he happened to be present upon that occasion, when this rule was passed barring the use of titles on the floor and in the reports, and he knew that the reason assigned at the time for that action was that members did not know whether to address certain members as "Professor" or not. That it was not the use of the official title, but the use of the courtesy title, that was confusing, and it was the use of that title which was interdicted. Another, and the more potent reason for the adoption of the editing rules in question was, that the claim was made that this Association was composed wholly of professors, and it was considered advisable to disabuse the minds of the retail druggists of the country of any such impression. The desire was to make everybody feel that all were pharmacists here. He did not understand how the President could know what was in the minds of members who advocated the adoption of this rule to abolish titles. He did not think the statement made by the President was altogether correct, and he wished to make this explanation of how the rule was adopted.

The Chair said he was always ready to apologize for a mistake ; but he also was present at the meeting in question, and he knew what was said at the meeting, and outside of the meeting. However, he would not press that matter, and was willing to withdraw this statement.

Mr. H. L. Taylor expressed the opinion that if the American Pharmaceutical Association could lead in a rational movement of this kind for the reform of the editing rules of this country, so that the American people might have some standard on this proposition, it would have accomplished a movement that had been in the air for a great many years. He did not believe the Association would ever have cause to regret having had the necessary energy to start a movement of such importance to the country.

Mr. Hallberg stated that he, also, was present when this matter of titles was considered by the Association, and he remembered the reason given for the adoption of the rule by Mr. Ebert at the time was, that when the average druggist of the country takes up a copy of the Proceedings, and looks over its pages and sees nothing but "Professor So and So," he will say to himself, "That Association is run by professors, and I don't want to have anything to do with it." For that reason Mr. Ebert moved to eliminate it from the proceedings, and the simple title of "Mister" be used instead. Mr. Hallberg said he thought this rule was a good one,

and ought to be retained, in the report of proceedings and in the discussions.

The Chair said there was no objection to that; that the question was simply upon the Directory of Members.

The Chair thereupon put the vote upon the adoption of the recommendations, and it carried.

The Chair appointed on the Committee on Editing Rules just provided the following:

H. L. Taylor, Albany, N. Y., C. S. N. Hallberg, Chicago, Caswell A. Mayo, New York, Francis B. Hays, New York, Henry Kraemer, Philadelphia.

The report of the Committee on Membership and Reception was called for, as the next order of business, and Mr. Day, Chairman of that Committee, made the following report:

REPORT OF THE GENERAL MEMBERSHIP COMMITTEE.

CHICAGO, April 30, 1910.

The Chairman of the Committee with the coöperation of the editor of the "Bulletin" began the campaign for members early in October in accordance with the instructions of the Council.

Considering the fairly uniform and faithful coöperation last year, the personnel of the Committee was but little changed and no time was lost, for the Committee was promptly appointed by the President.

The method of last year was followed except that the monthly letters were for the most part re-drawn in the endeavor to make them more attractive.

Four lists were obtained without much delay and a fifth list of one hundred from Texas was subsequently added, making a total of seven hundred and forty-two (742) names of eligibles. Besides these sixty members of Pharmacy Boards and two hundred officers of State Pharmaceutical Associations have received one or more letters and the "Bulletin" at regular intervals.

Of the four original lists containing about six hundred and forty names the first three have now expired: that is the last letter (No. 5) has been sent to them "inquiring why since they were recommended by Mr. — they have not responded to our former letters," etc.

These lists have been returned to the senders informing them from whom applications have been received, and requesting them to make one final effort to secure their membership, and if desirable to revise the list and return it.

This appears to have had the desired effect, since many have felt compelled to write, who have not been heard from before, that "they appreciate the opportunity to join and may do so in the near future," etc.

The scheme came near being a failure toward the end of the year because instead of limiting the number of names to ten or twenty from each member, a number of lists with forty to fifty names were received, and as it was thought desirable, all these were added until the number was too large to be covered once per month as intended.

This was soon corrected, however, and some of the lists deferred until the first list of two hundred expired.

Unless the letters are received at least monthly the cumulative effect is lost and it is a question whether or not the letters should not be sent semi-monthly instead of monthly. It is strongly advised that this should be tried next year.

Of course one thousand names could be handled monthly by using duplication, but the postage and other expense would exceed the amount now appropriated, \$60.00 per month.

Some experimentation has been conducted to determine the practicability of the employment of duplicate letters and the results with the Neostyle have been so successful as to recommend its use in the third and fourth letters. The fifth letter or last requiring insertion of the name of the recommending member, must always be individually written.

One-fourth of the time of the stenographer is devoted to the mailing list of the "Bulletin," which is inseparably connected with the membership work, since to every candidate is sent the "Bulletin," and when he becomes a member his name must be added to it. The time for the letter-writing may therefore be economized to afford the time necessary to the "Bulletin."

NOTE.—It is most earnestly requested, however, that members of the committee limit the names sent in to the number asked for. Experience has amply demonstrated that from ten to twenty names can be handled by both parties concerned to the best advantage and bring the best results.

In exceptional instances a larger list may be used to advantage, as in Texas this year where the popularity of the President-elect brought splendid results, or where the Branch officers enter on a vigorous campaign for members, as Messrs. Beal, Koch, Saalbach, Blumenschein and Pritchard have done in Greater Pittsburg the past year, and Messrs. Burge and White in Nashville within the last few weeks.

The arguments advanced to the candidates for joining the Association have been varied from time to time without any appreciable difference in results, except that when the last letter is received many appear to be conscience-stricken, and either send in their applications or at least gladden our hearts with the information that they are actually considering "joining" us. This is the crux of such a campaign. If they can be made "to feel guilty" they are not hopeless and the committee feels encouraged.

EXPENDITURE.

The cost of the seven months' work exceeds slightly the sixty dollars per month appropriated, being \$426.81 for seven months, or \$6.81 in excess, a trifle less than one dollar per month.

Nearly one hundred names have passed through this office, representing five hundred dollars received. The receipts, therefore, barely exceed the expenditure, but it should be borne in mind that most of the work is preparatory to the meetings of the State Pharmaceutical Associations, which have not yet begun. These meetings commence in May (except Alabama and Arkansas; Louisiana having been postponed), and in June are in full force, continuing throughout July and August.

STATE ASSOCIATION MEETINGS.

It is at these meetings that the principal recruiting of new members must be had, and arrangements are being made for members of our committee to represent our Association, and with the help of our other members add to our membership.

It is believed a serious omission that the American Pharmaceutical Association has not always been represented at the State meetings, and that the principal duty of our President should be to appoint one of our members for such representation, and have him see to it that such delegate appear on the program of every State Pharmaceutical Association meeting right at the first session. This has been done by another Association, and the American Pharmaceutical Association certainly has equally good claims to attention when it is a question of what has been done for pharmacy and the pharmacists of the country.

Over two hundred new members have been elected by the Council, but there is no way of determining how many of these may be credited to the work of this committee. Nor is there information now at hand on how many of these the Branches have received rebate of one dollar for each new member as decided by the Council. But even allowing rebate on fifty members, the balance would approximate fifty per cent. over the amount expended by this committee.

Efforts were made to secure a solicitor on the basis offered by Mr. J. H. Beal last year but so far without results, but the approaching summer months may afford opportunity to try the scheme.

The loss of membership from death has been unusually heavy the past year, many of our oldest members having passed away, among these P. C. Candidus of Mobile, Alabama and William Martin Searby of San Francisco, California, members of this Committee who could always be relied on to get their share of members.

The resignations were numerous and probably inevitable for many reasons; but the losses through being dropped for non-payment of dues, while not as large as last year, were much too large—somewhat over one-hundred members. It is believed that this failure to pay the current dues promptly is largely owing to the provision that membership may be retained until the delinquent is three years in arrears. When a member owes as much as ten to fifteen dollars it is difficult to make him pay up and usually, he must be dropped from the roll.

STATEMENT OF EXPENSES OCTOBER, 1909, TO APRIL 30, 1910, INCLUSIVE.

1909 October expenses	\$56 00	Itemized as follows:	
1909 November expenses	75 38	Rent of Typewriter 8 months at	
1909 December expenses	66 18	\$3.00	\$24 00
1910 January expenses.....	53 00	Supplies	10 43
1910 February expenses	56 00	Stationery	21 35
1910 March expenses.....	64 00	Expressage on blanks.....	1 13
1910 April expenses.....	56 25	Postage	70 00
		The stenographer, Miss E. Baker,	
Total seven months	\$426 81	30 weeks at \$10.00.....	300 00
		Total	\$426 81

Should the annual meeting in this populous center contribute its quota of members, the prospects at the meetings of the State Pharmaceutical Associations should finally enable the Committee to reach the long-expected goal of five hundred new members.

With great appreciation to the members of the Committee, who have so zealously assisted in the work, shared equally with the Editor of the Bulletin.

I am faithfully,

For the General Committee on Membership,

W. B. DAY, *Chairman*.

The Chair called attention to the fact that there was a recommendation in the report that the President appoint a member of this Association for each State Association meeting, to represent this body, and called for action on this recommendation.

Mr. Mayo moved that the President be authorized and requested to appoint a member of this Association to represent it and coöperate with the Committee on Membership at each State Association meeting. This motion was duly seconded and carried.

Mr. Eberle called attention to the fact that the Section on Historical

Pharmacy had passed a resolution at its meeting this morning, requesting that a librarian be provided for that Section, and he wished to give notice of such action. The Chair asked if Mr. Eberle could give a little more specific information about this matter, and Mr. Eberle responded that this action was taken upon the recommendation of Mr. Kremers, Historian of the Section on Historical Pharmacy, who stated that the time had arrived when the publications and documents now in the hands of the Section should be placed in the charge of a librarian until such time as the Association should be provided with a library.

Mr. Mayo stated that his impression was, that it was a librarian of the Association, and not of the Historical Section, that was contemplated. His reason for thinking that was, on account of the reference books received and exchanged by the General Secretary of the Association, and he understood the reference to the Association to mean that the by-laws should be amended accordingly.

The Chair suggested that this matter be referred to the Council, to secure more exact information from the Section, and Mr. Eberle agreed to this. It was so ordered.

The Secretary stated that the report of the Committee on U. S. Pharmacopœia had come to the Association in general session from the Section on Scientific Papers with a resolution to the effect that the set of general principles formulated be referred back to the general session, without recommendation.

The Chair stated that he believed the reason for this was that the Section felt that anything coming from the Association at this time would go to the Pharmacopœial Convention direct, and not to the Committee on Revision, and it was more appropriate to come from the Association itself. He thought Mr. Beringer could give more exact information on this point.

Mr. Beringer stated that the situation was simply this: That when the report was presented to the scientific Section on yesterday evening, the various recommendations were read over and considered, and the rule was adopted that if no objection was offered to a particular recommendation it should be passed as approved. Some objection was made, and a question arose as to whether one or two of the recommendations should be adopted, and it was considered best to refer all these recommendations to the Association proper. It was thought highly desirable that the delegates from this Association should go before the Pharmacopœial Convention with some definite statement of principles as to what was desirable in the forthcoming revision of the Pharmacopœia, and he wanted to move now that the Association take up these various recommendations and pass on them, and when there was no objection made to consider that recommendation as adopted. Where there was objection the Association could amend or eliminate it. In this way the delegation to the Pharmacopœial Convention would have some basis for its guidance at the convention.

This motion was seconded by Mr. Raubenheimer, of Brooklyn.

The Chair put the vote on the motion as made and it was adopted, and Mr. Beringer was called on to read the first recommendation, which he did, as follows :

1. Scope. The Pharmacopœia shall be a book of standards for such substances as are sufficiently used as remedial agents to warrant recognition and the fixing of proper standards. We recommend that the limitations to the scope of the Pharmacopœia adopted for the 8th Revision, and set forth in Article I (see Introduction U. S. P., VIII, p. XXX), be readopted for the next revision.

There was no objection to the recommendation as read, and it was passed as adopted.

Mr. Beringer read the second recommendation, as follows :

2. Function. The Pharmacopœia is not to be considered as an authority on therapeutics, and the admission or deletion of any article is not to be considered as an indication of its medicinal value.

There was no objection to this recommendation, and it was declared by the Chair to be approved by the Association.

Mr. Beringer read the third recommendation :

3. Doses. That doses be continued in the Pharmacopœia under the rule adopted for the 9th Revision, and that these be corrected wherever necessary, and that in addition, for potent remedies, the maximum single and the maximum daily dose also be given.

The Chair called on Mr. Raubenheimer to say what he thought of this proposition of a maximum dose. Mr. Raubenheimer replied that he had expressed his opinion on this the other day, and he thought this maximum dose should be followed by a distinctive mark ; but that this could be easily arranged.

There being no objection, this recommendation was likewise passed as approved.

Mr. Beringer read the fourth recommendation :

4. Nomenclature. That the present rule relating to changes in titles (Introduction p. XXXI) be re-adopted with only such modifications as are necessary to comply with the subsequent suggestions.

There was no objection, and the recommendation was approved.

The fifth recommendation was read by Mr. Beringer :

5. Botanical Names. That changes in the present botanical names be made only for well-defined reasons and such changes shall conform to the rules of the International Botanical Congresses.

Mr. Hallberg asked how this would affect gambir. Mr. Beringer explained that this related to the botanical names of plants, not titles.

This recommendation was likewise adopted.

Mr. Beringer read the sixth recommendation :

6. Names for Synthetic Chemicals. That for synthetic chemicals with lengthy chemical names, the committee coin wherever practical short euphonious titles contracted from the true chemical names and that the latter be always given as one of the English titles.

The Chair declared this recommendation adopted, as there was no objection.

The seventh recommendation was read by Mr. Beringer :

7. Purity Rubric. That the purity rubric as introduced in the eighth revision be continued and extended wherever practical and especially as related to crude drugs.

There was no objection to this recommendation, and it was declared adopted.

The eighth recommendation was read by Mr. Beringer :

8. Improved Descriptions and Definitions. That the official definitions and descriptions be carefully revised so as to meet the present need as legal standards.

The Chair stated that the substance of this recommendation has already been adopted in connection with a recommendation in the President's Address, and he assumed there would be no objection to this. It was declared adopted accordingly.

The ninth recommendation was read :

9. Committee on Drug Markets. That the Committee on revision be requested to appoint a special committee to make a thorough investigation of the quality of crude drugs in commerce both in this country and abroad, and to co-operate with the U. S. Government Departments in such investigations, and that this committee be instructed to endeavor to determine the proper limits to variability due to soil and climatic conditions or improper handling and to suggest such improvements as can be introduced in collecting and marketing such wares.

The Chair stated that he understood that this recommendation had been quite fully discussed in connection with this report, and seemed to be approved. It was declared adopted accordingly.

The tenth recommendation was read :

10. Standards for Crude Drugs. That reasonable and proper standards be introduced for crude drugs, wherever practicable, that will insure a satisfactory quality for the pharmacist and exclude substandard, fictitious or adulterated materials.

There was no objection, and the recommendation was adopted.

The eleventh recommendation was read :

11. Standards for Powdered Drugs. That titles and standards be introduced for such drugs as are properly used in the ground or pulverized condition and where the standards for the whole are not applicable to the powdered drug.

The Chair stated he thought perhaps this recommendation might be omitted, because almost exactly the same thing had been adopted in connection with the President's Address, after discussion, and it would seem to be unnecessary to adopt it here. Mr. Beringer, however, said he thought it would be well to have it in concrete form, and Mr. Hallberg agreed with this view, as also Mr. Good, of St. Louis. The Chair thereupon declared the recommendation approved.

Mr. Beringer thereupon read the twelfth, thirteenth, fourteenth and fifteenth recommendations as follows, and there being no objection, they were declared duly approved :

12. *Assay Processes.* That the assay processes be extended to all drugs and preparations permitting of satisfactory testing in this way and that identity tests for the purity of the isolated active principle be included wherever possible.

13. *Pharmacognostic Descriptions.* That with the description of a crude drug, brief pharmacognostic descriptions both macroscopic and microscopic where possible be given and the appearance of the structural elements in the powder when examined microscopically as a means of detecting adulteration.

14. *Methods of Storing and Preventing Deterioration.* That instructions be incorporated for the proper storing of each article and methods of preventing deterioration.

15. *Time Limit on Drugs.* That a time limit of permissible use be fixed on each drug and preparation that is prone to deterioration or change of active constituents.

Mr. Beringer next read the sixteenth recommendation :

16. *Fineness of Powders.* That the designation of the fineness of powders be continued to be stated in terms of the number of meshes to a linear inch of a sieve through which the powder will pass, and that the diameter of the wire in the official sieve be fixed.

Mr. C. Caspari, Jr., suggested that it would seem that the concluding clause of the paragraph, "and that the diameter of the wire in the official sieve be fixed," was unnecessary, as the present Pharmacopœia directs the gauge of the wire to be used, and that would settle this matter. Mr. Payne, of Georgia, concurred in this view. Mr. Francis, of Detroit, thought it would do no harm to repeat this, and Mr. LaWall, of Philadelphia, concurred. Mr. Caspari did not insist upon the suggestion, and the Chair declared that the recommendation would stand approved as read.

Mr. Beringer read the seventeenth recommendation :

17. *Powdered Drugs.* The powdered drug to represent the entire drug. Where the drug can be powdered without residue this should be required; in other cases the allowable tailing or residue should be determined.

Mr. Raubenheimer said he was in favor of this recommendation, but that there were exceptions to the rule.

The Chair asked how it would do to insert the words, "unless specifically stated otherwise." Mr. Beringer said he would consent to this. The Chair stated that with that change the section would be considered ap-

proved—with the words “unless specifically stated otherwise” inserted after the word “drug” in the second line. It was so ordered.

The eighteenth recommendation was read by Mr. Beringer :

18. *Synonyms.* That the proper English name under which the article is commonly sold be given, along with the Latin title, of each drug and preparation, and that a list of less important or less frequently used names be published with the other titles as a table of synonyms.

The Chair said he thought the Association should consider this recommendation carefully; that there was a good deal of difference of opinion between those who thought that synonyms should be put in a table to themselves and those who thought it would not be more convenient to give them in connection with the main titles, as is done in the Dispensatory. He thought it was a question that the Association should not pass upon without due thought, and perhaps regret its action afterwards.

Mr. Good, of St. Louis, could see no advantage in a table of synonyms if they were given under the proper heads—given after the name of the drug. He thought that was all that was necessary. The Chair replied that this was to have it in the Index, that was all. Mr. Good thought there was no objection to that.

Mr. Beringer was in favor of the recommendation as it stood, and the Chair said he presumed the committee had studied this matter out carefully, and if there was no objection the recommendation would be approved. It was so ordered.

The nineteenth recommendation was read :

19. *General Processes.* That type processes and general formulas be introduced wherever possible so as to prevent useless repetition in the text of formulas.

There was no objection, and the recommendation was approved.

The twentieth recommendation was read :

20. *Description of Galenicals.* That terse and concise descriptions of the official preparations be given after each formula.

The Chair invited an expression upon this recommendation, and Mr. Kraemer of Philadelphia and Mr. Ford, of Denver, said they thought it was all right. It was approved accordingly.

Mr. Beringer read the twenty-first, twenty-second and twenty-third recommendations as follows :

21. *Sterilization.* That a chapter on sterilization be introduced describing the proper methods for sterilizing medications and apparatus and indicating to what preparations each method is especially applicable.

22. *Atomic Weights.* That the current international standard of atomic weights be adopted for all official chemical formulas and calculations based thereon.

23. *Structural Formulas.* That structural formulas be not given in the revision of the U. S. P.

There was no objection to these recommendations, and they were approved as read.

Mr. Beringer read the twenty-fourth recommendation :

24. Discriminating Tests for the Druggist. That the simplest identification tests for the needs of the pharmacist be stated first in the list of tests and be in special type.

Mr. Wilbert stated that this was one of the paragraphs that was specifically objected to in the Section on Scientific Papers yesterday afternoon.

It was pointed out that a distinction of this kind might lead to serious complications, as a distinctive type applied to one test might be construed as an indorsement of that test as distinguished from the others, thereby leading to complications in a legal way. He said the recommendation had been discussed at some length, and many of the members present objected to its wording, while others thought it might be eliminated altogether, without in any way impairing the force of the general statement of principles.

Mr. Mayo moved that the last five words, "and be in special type," be stricken from the paragraph, and Mr. Wilbert seconded this motion.

Mr. Richtmann, of Florida, said that this would disturb the entire system that had prevailed, and that that point was made in the discussion before the Section.

Mr. Beringer said if there was any doubt about this matter, he would be willing to let the entire paragraph go out, and Mr. Kraemer amended the motion of Mr. Mayo to that effect, that the Association eliminate this paragraph. The Chair stated that, without objection, this paragraph 24 would go out, and it was so ordered.

The twenty-fifth and twenty-sixth recommendations were read by Mr. Beringer :

25. Official Methods for Physical Constants and Chemical Determinations. That there be included official methods for determining the usual analytical data, such as specific gravity, melting and congealing points, ash, solubility, extractive, percentage of water, alcohol, ether, etc.

26. Normal Temperature. That an agreement be made between the Committee on Revision and the United States Bureau of Standards, by which a uniform official national normal or standard temperature shall be established for determining such constants as specific gravity and solubility, and at which apparatus should be certified.

No objection was made, and these recommendations were declared adopted.

Mr. Beringer read the twenty-seventh recommendation :

27. Definition of Admitted Impurity. That the character and composition of the innocuous impurities allowable in medicinal chemicals be stated with proper limitations and tests.

The Chair asked how this recommendation differed from the Purity

Rubric, and Mr. Beringer replied that the Purity Rubric might say 99 per cent. pure, but this would not say in what the impurities shall consist.

No objection was made, and the recommendation was adopted.

The twenty-eighth recommendation was read :

28. Distinction between Medicinal and Technical Substance. That the statement relating to substances sold solely for medicinal purposes in the preface of the 8th Revision, page xxxix, be re-incorporated in the 9th Revision, and that the principle involved be stated clearly and more forcefully if possible.

The Chair stated that he understood this was one of the cases where there might be some proposition to remove it, and the committee wanted to forestall any such action by stating its views.

There was no objection, and the recommendation was adopted.

Mr. Beringer read the twenty-ninth recommendation :

29. Weights and Measures. That the metric system of weights and measures only be used in the descriptions and formulas.

There was no objection, and the recommendation was adopted.

Mr. Beringer read the thirtieth recommendation :

30. Alcohol Content. That with each formula for a preparation containing alcohol, the average alcoholic content of the product be given.

Mr. Wilbert stated that this was another of the paragraphs where there was considerable difference of opinion, and it was pointed out that this provision, if adopted in the Pharmacopœia, might make a serious complication. The objection might be overcome by saying that the *range* of the alcoholic content should be stated—by making it “range” instead of “average.” He believed the gentlemen who had pointed out this objection were not present, but thought in a general way this covered their objection.

Mr. Hallberg doubted the policy of incorporating all these details in a statement of principles, and thought that something should be left to the Committee of Revision. He asked whether the language employed, “the average alcohol content,” meant the per cent. by volume of absolute alcohol.

Mr. Beringer said that the idea was that the percentage of alcohol should be stated within a range, so that the pharmacist in making a preparation might state the Pharmacopœia requirement on his label, and save himself the necessity of determining the absolute alcoholic content of the mixture.

Mr. Wilbert suggested that if the pharmacist said the average content was 50, he would still have to make the determination. This would fix a standard, and then the pharmacist would be absolutely required to comply with that standard.

Mr. Francis said he was the man who raised the protest in the Scientific Section. He made the point on account of the retail pharmacist being subjected to this annoyance and expense. The Interstate Commerce label as to alcoholic preparations must bear the alcoholic content, but why should the local pharmacist burden himself to determine the alcoholic content in preparations made for local use? Why should he lay upon himself the unnecessary burden of having to assay his product to make his label good?

Mr. Beringer said he had no objection to striking this provision out of the recommendation, although he thought the gentleman who had last spoken was mistaken in his position.

Mr. Payne did not think well of the proposition to substitute "range" for "average," as, while it seemed a good way to settle this trouble, he was sure it would lead to trouble in the courts. His experience in Georgia had convinced him that this would be the result. Recently, he had had occasion to look into some fluidextracts, and he had found that they were running several per cent. in alcohol below the average, and he thought it was an unsafe thing to fix a range. It was hard to have a fast rule, but if the pharmacist does not have some definite standard, when he goes into the courts he is certain to have trouble.

Mr. Hallberg thought that the fault lay with the label printer. The label printer sells labels for Interstate Commerce, and one printer in Chicago will send labels all over the United States, with the exact alcoholic content printed on the labels. This was especially true as to a number of the Southern States—as Arkansas for example, where they had adopted the Federal Pure Food Law, which requires the alcoholic content to be stated. He said he thought it very important that the Association should take the right position in this matter, and he favored a declaration that for such and such purposes a range might be permitted in the alcoholic strength of five per cent. either way, below or above.

Mr. Ford said that in Colorado it was not required that the alcohol content should be stated; that the Federal law had been improved upon to that extent, and any article made according to the requirement of the Pharmacopœia or National Formulary needed only to bear its official name, and the alcohol content was not required to be stated. Of course, if it was shipped into another State, it would come under the regulations of the Federal Pure Food and Drugs Law, and would have to have the content stated on the label. He thought this feature was one that could be carried throughout the entire book. He thought the pharmacist would not have to assay his preparations, if he observed carefully the official formula, kept the temperature uniform, and the bottle tightly corked, as the alcoholic content, unless decomposition set in, would remain uniform.

Mr. Clark, of Chicago, said that if it were practically possible to devise a working formula for the manufacture of tinctures or fluidextracts which

would yield, under different conditions, the same amount of alcohol each time, it would be very desirable. Take fluidextract of belladonna, for instance; with that preparation made according to the official formula, under varying conditions of temperature, exposure and so on, the alcoholic content will vary in an amount far exceeding any reasonable range that could be placed on it in the Pharmacopœia. The range of alcoholic strength is very much more than five per cent. under varying conditions, and if that strength is required to come within a certain range, the pharmacist will be compelled to assay his product every time, to make certain of its coming within the specified limits, and that would be an exceeding hardship on him.

Mr. Stevens, of Ann Arbor, thought it absolutely essential that a range should be stated, as, if a definite amount of alcohol content is stated on the label, the pharmacist is necessarily compelled to assay the preparation every time. He said that, as Mr. Francis had made clear yesterday, the manufacturer in making a large amount of fluidextract or tincture, can very easily assay it and put on the label the exact amount of alcohol it contained; but if that requirement is made of the pharmacist, he will not make his own preparation and assay it, but will buy from the manufacturer and not take the chance himself. Moreover, a difference in the weather—the difference between dry and wet weather—and the character and quality of the drug used, have a marked effect upon the product, and for all these reasons it is desirable to have a range for the alcoholic content. Mr. Stevens also thought it might be well to add to this recommendation, after the word "given," a clause to the effect that the product be given in terms of per cent. by volume.

Mr. Raubenheimer thought that Mr. Beringer meant by this thirtieth recommendation to show that the retail pharmacist could manufacture his own preparations. What is wanted is an approximation, as it is impracticable for the pharmacist to state the exact percentage of alcohol.

Mr. Good, of St. Louis, said it was easy enough to calculate how much alcohol is put into a preparation, but the proportion of alcohol in the finished preparation is a very different matter. He did not take to the committee's suggestion to state the average amount of alcohol content, and he doubted very much the feasibility of stating the range of alcohol content. He had seen labels where the maximum amount of alcohol content was stated.

Mr. Holzhauer could see no reason, aside from the legal requirement, why the alcohol content should be stated when a preparation is made according to a formula of the Pharmacopœia.

Mr. Payne said that where the range of alcohol content was given in pharmaceutical preparations, the courts had always decided that the lowest percentage named was the one that was binding. He suggested that the wording of the recommendation be changed to "calculated alcohol content."

Mr. Hallberg said that, in his opinion, there would not be very much difference in the extractive proportion of the drug where the preparation is made according to the official formula, unless the druggist "went to sleep on his job" and left it standing around in an open vessel, and not tightly covered, for a day or two, when of course there would be an evaporation of the alcohol. He was satisfied that if the official formula was carefully followed there would be very little variation as to tinctures and fluidextracts. He thought that Mr. Clark was mistaken in thinking there would be such a wide range in result, where the article was made under the proper conditions.

The Chair suggested that the Association was consuming a good deal of valuable time on this question, which was not a vital one, as, even if no recommendation at all was made, the pharmacopœial convention would take care of the matter.

Mr. Payne called attention to the fact that he had moved to amend by inserting the word "calculated" in the place of "average" in the recommendation, but the Chair said this was not acceptable.

The Chair stated that the question now was upon the substitution of the word "range" for "average" in the recommendation, and said that Mr. Beringer had already agreed to that. A vote was thereupon taken upon the adoption of the recommendation as thus amended, and it carried.

Mr. Beringer read the 31st recommendation of the committee :

31. That wherever the Ninth Revision of the Pharmacopœia of the United States specifies a definite standard of strength or purity for any substance it shall also supply or contain an accurate and reliable method for the testing or assaying of said substance.

There was no objection to the recommendation, and it was declared adopted.

The Chair said a motion was now in order to adopt the recommendations submitted as a whole, and to request the delegates of this Association to the pharmacopœial convention to submit them to that convention. He said that in putting this vote he would like to call the attention of the members to the great amount of work that the committee had done in studying over each of these propositions before they had brought this statement of principles before the Association for action.

Mr. Clark asked if this provision referred to the Purity Rubric clause as well as the others.

Mr. Francis said that the motion made had no reference to the Purity Rubric ; that it simply meant this : That if the Pharmacopœia mentioned a substance, and said that that substance must be of a definite character and strength, it must also provide a necessary and proper assay method for determining the purity of that particular substance, and not force a man to go to some work on chemistry to get an assay, or to get it out of his head or somewhere else.

The Chair stated that everybody having anything to do with assaying was objecting to the present Pharmacopœia because of its failure to provide such assay methods.

Mr. Holzhauer said that as he understood the status of the recommendations now, it was that in Section 17, Powdered Drugs, after the word "drug," the first word in the second line, there should be inserted the words, "unless specially stated otherwise;" that Section 24 had been eliminated, and Section 30 amended by substituting the word "range" for "average," before the words "alcohol content" in the second line. With this understanding, he moved the adoption of the recommendations as a whole.

Mr. Raubenheimer stated that at a symposium upon the subject of the Pharmacopœias of the world, in the Section on Practical Pharmacy and Dispensing last night, Mr. Kraemer had called attention to the fact that the latest edition of the Dutch Pharmacopœia contained a chapter on antidotes, and said it had been moved by Mr. Hallberg, duly seconded, that it be recommended that a chapter on antidotes be included in the Ninth Revision of the Pharmacopœia. He offered this as an amendment to the motion of Mr. Holzhauer to adopt the recommendations as at present amended as a whole. This motion had a second in Mr. Ford and Mr. Hallberg.

Mr. Payne also heartily seconded this motion, as his experience had proven the desirability of such a chapter.

Mr. Holzhauer said he would be glad to accept the amendment to his motion. The Chair thereupon put the vote upon the motion of Mr. Raubenheimer to recommend the addition of a Chapter on antidotes in the Pharmacopœia, and it carried.

The Chair then put the vote on the adoption of the entire list of recommendations as presented and amended, with instructions to the delegates from this Association to present the same to the Pharmacopœial Convention as a statement of principles offered by this Association for guidance in the Ninth Revision of the Pharmacopœia. The motion was carried unanimously.

The recommendations as a whole, thus amended and adopted, here follow :

GENERAL PRINCIPLES TO BE OBSERVED IN THE NINTH REVISION OF THE U. S. PHARMACOPŒIA.

1. *Scope.*—The Pharmacopœia shall be a book of standards for such substances as are sufficiently used as remedial agents to warrant recognition and the fixing of proper standards. We recommend that the limitations to the scope of the Pharmacopœia adopted for the 8th Revision and set forth in article 1 (See Introduction U. S. P. VIII. p. XXX) be re-adopted for the next revision.

2. *Function.*—The Pharmacopœia is not to be considered as an authority on therapeutics and the admission or deletion of any article is not to be considered as an indication of its medicinal value.

3. *Doses*.—That doses be continued in the Pharmacopoeia under the rule adopted for the 8th Revision and that these be corrected wherever necessary and that in addition for potent remedies the maximum single and the maximum daily dose also be given.

4. *Nomenclature*.—That the present rule relating to changes in titles (Introduction fol. XXXI) be re-adopted with only such modifications as are necessary to comply with the subsequent suggestions.

5. *Botanical Names*.—That changes in the present botanical names be made only for well-defined reasons and such changes shall conform to the rules of the International Botanical Congresses.

6. *Names of Synthetic Chemicals*.—That for synthetic chemicals with lengthy chemical names, the committee coin wherever practical short euphonious titles contracted from the true chemical names and that the latter be always given as one of the English titles.

7. *Purity Rubric*.—That the purity rubric as introduced in the eighth revision be continued and extended wherever practical and especially as related to crude drugs.

8. *Improved Descriptions and Definitions*.—That the official definitions and descriptions be carefully revised so as to meet the present need as legal standards.

9. *Committee on Drug Markets*.—That the Committee on revision be requested to appoint a special committee to make a thorough investigation of the quality of crude drugs in commerce both in this country and abroad, and to co-operate with the U. S. Government Departments in such investigations, and that this committee be instructed to endeavor to determine the proper limits to variability due to soil and climatic conditions or improper handling and to suggest such improvements as can be introduced in collecting and marketing such wares.

10. *Standards for Crude Drugs*.—That reasonable and proper standards be introduced for crude drugs, wherever practicable, that will insure a satisfactory quality for the pharmacist and exclude substandard, fictitious or adulterated materials.

11. *Standards for Powdered Drugs*.—That titles and standards be introduced for such drugs as are properly used in the ground or pulverized condition and where the standards for the whole are not applicable to the powdered drug.

12. *Assay Processes*.—That the assay processes be extended to all drugs and preparations permitting of satisfactory testing in this way and that identity tests for the purity of the isolated active principle be included wherever possible.

13. *Pharmacognostic Descriptions*.—That with the description of a crude drug, brief pharmacognostic descriptions, both macroscopic and microscopic, where possible, be given, and the appearance of the structural elements in the powder when examined microscopically as a means of detecting adulteration.

14. *Methods of Storing and Preventing Deterioration*.—That instructions be incorporated for the proper storing of each article and methods of preventing deterioration.

15. *Time limit on Drugs*.—That a time limit of permissible use be fixed on each drug and preparation that is prone to deterioration or change of active constituents.

16. *Fineness of Powders*.—That the designation of the fineness of powders be continued to be stated in terms of the number of meshes to a linear inch of a sieve through which the powder will pass, and that the diameter of the wire in the official sieve be fixed.

17. *Powdered Drugs*.—The powdered drug to represent the entire drug, unless specifically stated otherwise. Where the drug can be powdered without residue this should be required; in other cases the allowable tailing or residue should be determined.

18. *Synonyms*.—That the proper English name under which the article is commonly sold be given along with the Latin title of each drug and preparation, and that a list of less important or less frequently used names be published with the other titles as a table of synonyms.

19. *General Processes*.—That type processes and general formulas be introduced wherever possible so as to prevent useless repetition in the text of formulas.

20. *Description of Galenicals*.—That terse and concise descriptions of the official preparations be given after each formula.

21. *Sterilization*.—That a chapter on sterilization be introduced, describing the proper methods for sterilizing medications and apparatus, and indicating to what preparations each method is especially applicable.

22. *Atomic Weights*.—That the Current International Standard of Atomic Weights be adopted for all official chemical formulas and calculations based thereon.

23. *Structural Formulas*.—That structural formulas be not given in the revision of the U. S. P.

24. *Official Methods for Physical Constants and Chemical Determinations*.—That there be included official methods for determining the usual analytical data, such as specific gravity, melting and congealing points, ash, solubility, extractive, percentage of water, alcohol, ether, etc.

25. *Normal Temperature*.—That an agreement be made between the Committee on Revision and the United States Bureau of Standards, by which a uniform official national normal or standard temperature shall be established for determining such constants as specific gravity and solubility, and at which apparatus should be certified.

26. *Definition of Admitted Impurity*.—That the character and composition of the innocuous impurities allowable in medicinal chemicals be stated with proper limitations and tests.

27. *Distinction between Medicinal and Technical Substances*.—That the statement relating to substances sold solely for medicinal purposes in the preface of the 8th Revision page xxxix be re-incorporated in the 9th revision and that the principle involved be stated clearly and more forcefully if possible.

28. *Weights and Measures*.—That the metric system of weights and measures only be used in the descriptions and formulas.

29. *Alcohol Content*.—That with each formula for a preparation containing alcohol, the range of alcohol content of the product be given.

30. That wherever the Ninth Revision of the Pharmacopœia of the United States specifies a definite standard of strength or purity for any substance it shall also supply or contain an accurate and reliable method for the testing or assaying of said substance.

31. *Antidotes*.—That a chapter on antidotes be introduced.

Mr. Beringer called attention to the fact that there was still another recommendation in the report of the Committee on U. S. Pharmacopœia which should be decided by this Association—the recommendation that the delegates should present to the Convention a copy of last year's report, as well as this year's report.

This motion was seconded by Mr. Hallberg and carried.

Mr. Whelpley moved that the Association direct the General Secretary to address to the Surgeon-General of the Public Health and Marine Hospital Service a letter expressing the appreciation of this Association of the services that department had rendered in co-operating with this organization in the work of the Committee on U. S. Pharmacopœia and National Formulary. This motion was seconded by Mr. Holzhauer and others, and was carried.

The Secretary said that he had a number of short communications that

he feared might be overlooked, and he would like to present them at this time. He read the following telegram from Little Rock, Arkansas :

LITTLE ROCK, ARK., May 5, 1910.

CHAS. CASPARI, JR., *Sec'y. Care Hotel Jefferson, Richmond, Va.*

Remembrance of my brethren touches me deeply. My disappointment was great, am improving.

JOHN B. BOND, SR.

The Secretary then read the following resolution coming from the Section on Scientific Papers :

Resolved, That the Scientific Section of the American Pharmaceutical Association request the Association in general meeting assembled to endorse their request that the U. S. P. convention direct the Committee of Revision to submit the proposed changes in the U. S. P. to the members of the A. Ph. A. for review before final adoption for inclusion in the U. S. P.

On motion of Mr. Beringer the resolution just read was adopted.

The Secretary read a second resolution coming from the Scientific Section as follows :

On motion of Mr. Sollman, seconded by Mr. Whelpley, resolved that the Section on Scientific Papers favors the recommendation by the American Pharmaceutical Association of the physiological standardization of drugs to the serious consideration of the United States Pharmacopoeial Convention.

Mr. Wilbert moved the adoption of this resolution, and the motion prevailed.

After the resolution had been adopted, Mr. Raubenheimer remarked that he desired to be considered not only a scientific, but a practical pharmacist, and he wanted the Pharmacopœia to be a practical book, so the average pharmacist could follow its directions, and he could not follow it if this method of standardization was adopted.

The Secretary read a third resolution emanating from the Scientific Section, as follows :

On motion of Mr. Hallberg, seconded by Mr. Selzer, resolved that the Section on Scientific Papers request the American Pharmaceutical Association to recommend that the Internal Revenue Department permit the use of such forms of distillers' package for alcohol for medicinal use as will obviate the objections to the present common barrel package.

Mr. Francis said that as he understood the force of this resolution, it was to permit the use of metal instead of wooden containers. Mr. Wilbert said that this was correct.

Mr. Hallberg thereupon moved the adoption of the resolution as presented, and the motion was duly seconded and carried.

The Secretary said that the Chairman of the Committee on Patents and Trade Marks was not present, but he had the report of the committee, a

typewritten document of considerable size. The Chair said he felt it would not be feasible to go into this report at length, unless the Association was ready to stay here all night.

Thereupon Mr. Wilbert, seconded by Mr. Ford, moved that the report be received, to take the usual course, and the motion prevailed. The report is as follows :

REPORT OF THE COMMITTEE ON PATENTS AND TRADE-MARKS.

The report of your Committee presented at the last annual meeting has been before the Association for one year, yet, although it deals with a subject vital in its importance to medical and pharmaceutical practice and to the public health, it has excited but little discussion. This is doubtless due to want of knowledge regarding the principles underlying the practice of medicine and pharmacy and the object of the patent and trade-mark laws in their relation thereto.

I. THE PROFESSIONAL PRACTICE OF MEDICINE AND PHARMACY.

But we must consider at the outset the fact that when a person enters one of the so-called liberal professions, namely, theology, law, or medicine, he takes upon himself the obligation to donate to his profession for common use the results of his observations and experience, and he is therefore forbidden to patent his inventions and discoveries.

The following by-law was recently presented to the members of the Philadelphia County Medical Society, and adopted at the business meeting April 20, 1910 :

"Any physician who shall procure a patent for a remedy or for an instrument of surgery, or who sells or is interested in the sale of patented remedies or nostrums, or who shall give a certificate in favor of a patented or proprietary remedy or patented instrument, or who shall enter into an agreement to receive pecuniary compensation or patronage for sending prescriptions to any apothecary, shall be disqualified from becoming a member; or if already a member, upon conviction of such offense in accordance with Art. VIII, he shall be *ipso facto* deprived of membership."

The arts of pharmacy and therapeutics are co-related and mutually dependent. The text-books and pharmacopœias are dependent upon the professional work of both pharmacists and physicians. Both are under the same obligations to science; both are bound to contribute the results of their observations and experience to the profession. But the pharmacist and manufacturer engaged in the practice of the pharmacologic arts deal with material substances and are dependent upon materia medica commerce for a living. This commerce requires the use of capital and its protection by legitimate commercial methods, including the legitimate use of patents and trade-marks. In spite of the fact that physicians are forbidden to patent their inventions or to derive an income from the sale of "patented or proprietary" medicines, it is considered perfectly ethical for physicians to copyright their books and to share with publishing houses in the profits derived from their sale. Why should there be an exception made against patented medicines? One of the reasons is that the patent and trade-mark system is used by the nostrum trade to protect and foster a commercial business conducted in opposition to legitimate medical and pharmaceutical practice by persons who are practicing medicine at wholesale and without diagnosis, to the great detriment of the public welfare.

II. THE PATENT SYSTEM.

The object of the patent law is to promote progress in science and the useful arts. We will therefore assume that when it is properly applied to medicine and pharmacy it is capable of promoting progress in medical science and arts.

The object of the patent law is not to protect inventors except as a means to an end.

Inventors do not possess a natural right to the exclusive use of their inventions. The exclusive right to the use of an invention, when such right exists at all, is a creature of statute and of grant, and subject to the conditions imposed by the statute and by the grant.

The exclusive right to practice medicine and pharmacy has already been granted to the medical and pharmaceutical professions respectively; therefore the government should not grant to *materia medica* inventors rights which conflict with the license to practice medicine and pharmacy.

The medical arts, including pharmacy, have as their primary object the prevention and cure of disease. Drugs to be of real service for this purpose must be employed in accordance with certain principles known and appreciated only by persons who possess a comprehensive medical and pharmaceutical education.

This fact is recognized in the medical and pharmacal laws, the principal aim of which is to ensure that no one who has not proved his possession of both theoretical and practical education shall practice the profession of medicine and pharmacy.

Unless the patent law is so applied as to promote progress in *Materia Medica* science and in the arts of pharmacy and pharmacotherapy, upon which that science is dependent, the object of the patent law is defeated. And, as these arts are co related and mutually dependent, the proper application of the patent law cannot be accomplished except under proper medical and pharmacal laws and codes of ethical rules jointly devised and adopted by the medical and pharmaceutical professions.

The primary object of the patent laws is often lost sight of when the subject of patent laws and their application to medical science and arts is discussed in professional and commercial circles and in the halls of State Legislatures and of Congress. The impression naturally derived from the character of the discussion is that the primary object of the patent law is to protect inventors in creating and maintaining everlasting monopoly of their invention, not the promoting of exact knowledge regarding inventions in order that science may be advanced and the public benefited by having the right to the free use of the inventions when the seventeen-year lives of their patents expire.

The Committee suggests as subjects of discussion:

1. Is it advisable for the United States Government to grant inventors of new *Materia Medica* products the right to their exclusive manufacture and sale, when such inventors employ commercial methods not in harmony with the professional practice of medicine and pharmacy? Or is it better policy for the government to revoke all such grants and to place the introduction of new *Materia Medica* products under professional control?

"a. There is a great difference in the character of the demand for *Materia Medica* products resulting from their proper use in medical and pharmacal practice, and the demand created by the misleading advertisements of certain commercial manufacturing houses engaged in the chemical and pharmacal industries. The former may be properly termed a natural demand, the result of the practice of medicine and pharmacy by qualified practitioners; the latter an artificial and fictitious demand, the result of ignorance and greed."

"b. The professions of medicine and pharmacy have a right to demand censorship and control over *Materia Medica* commerce, provided the professions themselves are conducted in a professional manner to promote progress in *Materia Medica* science and the useful arts of pharmacy and therapeutics; they have a right to demand that no grant shall be given to individuals, firms, or corporations not in harmony with the proper practice of medicine and pharmacy; they have a right to ask the government to revoke all patent grants not practiced in harmony with the altruistic principles upon which medicine and pharmacy are founded; and the government not only has the right to revoke such grants but is in duty bound to do so in defense of the public welfare."

2. Progress in pharmacy and therapeutics is dependent upon the impartial discussion

of *Materia Medica* products in the medical and pharmaceutical journals. Is it possible to obtain such discussion under a system of *materia medica* monopoly, in which new products are controlled by product patents, and physicians and pharmacists are, threatened with reprisal by the monopolists if their expressions regarding such products are unfavorable?

3. Progress in *Materia Medica* science and arts is likewise dependent upon the standardization of *Materia Medica* products, and the codifying of such standards in the United States Pharmacopoeia and the National Formulary. Are such standardization and codification hindered or promoted when *Materia Medica* products are subjected to commercial monopoly and are introduced by misleading advertisements?

4. The patenting of *materia medica* products is considered inimical to public interests in nearly every civilized country in the world, even in Russia; yet such patents are allowed in the United States of America. In most foreign countries patents are allowed for processes and machinery for manufacture. Should the granting of product patents by the United States Government be abolished and process patents be allowed? If process patents only are allowed the law should be modified to make it truly protective.

5. Is it wise public policy for the United States government to grant to foreign inventors patents by which they are enabled to build up industries in foreign lands at the expense of this country, or should the granting of patents be limited to inventions manufactured in the United States?

III. THE TRADEMARK QUESTION.

The function of the trademark is to indicate the ownership or origin of the brand, not the ownership of the product. There can be no ownership of a product of such nature as to prevent others who possess the necessary knowledge from making and selling the same product under its proper or descriptive name, unless such product is patented. It is axiomatic that "no one can claim protection for the exclusive use of a trademark or trade name which would practically give him a monopoly in the sale of goods other than those produced or made by himself. If he could, the public would be injured rather than protected, for competition would be destroyed. Nor can a generic name, or name merely descriptive of an article of trade, of its qualities, ingredients or characteristics, be employed as a trademark, and the exclusive use of it be entitled to protection."*

"When an article is made that was theretofore unknown, it must be christened with a name by which it can be recognized and dealt in, and the name thus given it becomes public property, and all who deal in the article have a right to designate it by the name by which alone it is recognizable."†

Before there can be a brand there must be a product with a name and identity of its own. Linen is a product. "York Mills" linen is the name of a brand. Condensed milk is a product. The word "Eagle" is used to designate the brand of a well-known manufacturer of this product. The office of a trademark is to point out the manufacturer of a brand. The words "York Mills" and "Eagle" are used by the manufacturers as pseudonyms, noms de plume, or commercial signatures, in place of the names of the manufacturers. When purchasers ask for "York Mills" linen and the merchant substitutes some other brand, without the consent of the purchaser, a fraud has been committed. This is fraudulent substitution.

Of late years the nostrum manufacturers have devised a system by which they are attempting to create and maintain monopolies upon unpatented *materia medica* products, by registering as trademarks the names which they have given to their products, and by prosecuting those who supply these products under these names unless the original brands are dispensed. It is manifest from the foregoing that this is unjust.

* Canal Co. *vs.* Clark, 13 Wall, p. 323.

† Leclanche Battery Co. *vs.* Western Elec. Co., 23 Fed. Rep., 227.

It is believed by many that when a person registers a name as a trademark he has been granted by the government the exclusive right to the use of such name. This is an error. No right is gained by registering a name as a trademark which gives the manufacturer the privilege of using the name except as a mark to distinguish his brand from other brands of the same article. There is no such thing as the ownership of a name *per se*.

Others believe that they can obtain the exclusive ownership of a name by copyrighting it. This is also an error. As stated in Circular No. 19, issued by the Librarian of Congress, Washington, D. C., "The copyright laws contain no provisions under which protection can be obtained upon a *mere name* or *title*. Entry cannot therefore be made in the Copyright Office for coined names, names of articles of manufacture, names of games or puzzles, names of substances, names of products or names of medicines."

The decision of the United States Supreme Court in the Singer Sewing Machine case brings out very clearly the principle of trademarks. This decision is as follows:

"The result, then, of the American, the English and the French doctrine universally upheld is this, that where, during the life of a monopoly created by a patent, a name, whether it be arbitrary or be that of the inventor, has become, by his consent, either expressed or tacit, the identifying and generic name of the thing patented, this name passes to the public with the cessation of the monopoly which the patent created. Where another avails himself of this public dedication to make the machine and use the generic designation, he can do so in all forms, with the fullest liberty, by affixing such name to the machines, by referring to it in advertisements, and by other means, subject, however, to the condition that the name must be so used as not to deprive others of their rights or to deceive the public, and therefore that the name must be accompanied with such indications that the thing manufactured is the work of the one making it as will unmistakably inform the public of that fact."

It is evident from this decision, and other evidence before furnished, that certain manufacturing houses are attempting to deprive the retail druggists of this country of their rights. The American Pharmaceutical Association should protest against this attempt. To make their protest effective, the subject should be presented to the medical profession in such a clear light that physicians can have no excuse in the matter. When a physician writes a name on his prescription he should know whether or not he means to specify a brand. The pharmacist who dispenses the product should also know what is intended. When the intent of the physician is to specify a brand, the pharmacist who without his consent dispenses another brand is guilty of fraudulent substitution and merits fine and imprisonment.

It has been suggested that a Committee on Nomenclature be appointed by the American Medical Association and the American Pharmaceutical Association, jointly, the duty of which shall be to investigate the status of each new *materia medica* product and to place the knowledge thus derived before the professions, either in the form of a special report or in the pages of the medical and pharmaceutical journals, so that the physicians when prescribing may be guided in relation to the names and the claims regarding them made by the manufacturers of the products.

This suggestion is worth considering, and the committee presents it for discussion.

RESOLUTION.

WHEREAS, The object of the patent law is to promote progress in science and useful arts; and

Whereas, Progress in the science of *materia medica* and in the arts of pharmacology and therapeutics, upon which it is dependent, requires that each *materia medica* product and preparation shall have a name of its own, which is free to science and commerce, whereby it may be identified, impartially discussed in the professional societies and press, and thus prepared for a place in the U. S. Pharmacopœia; and

Whereas, The practitioners of the pharmacologic arts, namely, pharmacists, chemists and manufacturers, are dependent upon *materia medica* commerce for a livelihood; and

Whereas, Commerce in *materia medica* requires the investment of capital and the protection of the same by the legitimate use of patents for new *materia medica* inventions, and trademarks for distinguishing between brands; therefore be it

Resolved, That the Report on Patents and Trademarks of the American Pharmaceutical Association, together with papers and discussions dealing in an explanatory way with the same subject, be referred to the manufacturing houses, with the request that they shall co-operate with the American Pharmaceutical Association in solving the several important problems presented by said report, and that the Committee on Patents and Trademarks be empowered to take such action and report the results of the conference at the next meeting of the American Pharmaceutical Association.

THOS. V. WOOTEN,
FRANKLIN M. APPLE,
F. W. MEISSNER,
F. E. STEWART, *Chairman*.

In the absence of Chairman Motter, of the Committee on Pharmaceutical Collection at Washington, the Secretary gave a brief abstract of the report, the full text thereof being as follows :

April 1, 1910.

To the President American Pharmaceutical Association :

Dear Sir : I beg to invite your attention to the following letter :

SMITHSONIAN INSTITUTION,
UNITED STATES NATIONAL MUSEUM, }
WASHINGTON, D. C., *March 26, 1910.*

DEAR DR. MOTTER: Replying to your letter of the seventeenth instant, I regret to say that it has not been possible, up to the present time, to give definite consideration to the subject of the proposed pharmaceutical collection in the National Museum, and there will be some further delay in the matter. This condition is largely due to the delays in completing the new building, which has retarded the re-arrangement of the existing collections much longer than was expected. I assure you, however, that the matter has not been lost sight of, and the correspondence is now together on my desk. Should you desire and find it convenient to call at the Museum, I shall be very glad to explain the circumstances more in detail.

Very truly yours,
(Signed) R. RATHBUN,
Assistant Secretary, in charge of National Museum.

There has been no other business in this connection requiring the attention of your committee. The committee can, therefore, only report progress. In a personal interview, Mr. Rathbun assured me of his continued and favorable interest in the general proposition, and he regrets that, under existing conditions, more rapid progress is impossible.

Respectfully submitted,
MURRAY GALT MOTTER,
Chairman, Committee on Proposed Pharmaceutical Collection at Washington.

The Chair explained the trouble about changing from the old to the new building in Washington, and said that the general tendency of the authorities of the museum was in the direction of liberality in such matters; that he had talked with them several times.

Mr. Wilbert stated that the new building was already overcrowded, and

the future in that direction did not give promise of a better condition. As a hope for the future, he outlined the prospects of the erection of a "George Washington Memorial Building," concerning which there was considerable sentiment in Washington City and in the country at large, in which it was proposed to house national associations of various kinds, and particularly scientific organizations. In this building would be room for library purposes, offices and a large convention hall, with smaller rooms for section meetings. The building as proposed would cost over \$2,000,000, and the proposition was to endow it so as to make it self-sustaining. A number of national associations were taking an interest in this movement, and he thought it would be wise if this Association would consider the advisability of coöperating with the promoters of this movement to the end of a possible development in the city of Washington of a headquarters for the Association. This Association is distinctly a District of Columbia organization, chartered under the laws of the District, and he thought it eminently fitting that it should have some affiliation with the capital of the country. He said he would like to see a committee appointed to inquire into the practicability of coöperating in an active way with the promoters of this George Washington memorial building movement, so as to participate in the possible benefits that might come from the erection of such a building. The idea as outlined at length was a most interesting one, and he thought it offered this Association an opportunity in the city of Washington.

Mr. Whelpley moved that Mr. Wilbert be made a committee of one to inquire into the possibilities of this George Washington memorial building proposition, and Mr. Hallberg seconded the motion, and suggested the raising of the necessary money through the sale of appropriate buttons at \$1 each. He thought this idea might be very attractive to members, and result in a substantial sum, and that such a good impression might be made as to induce those having the matter in hand to provide a hall and ample space for the Association.

Mr. Wilbert asked Mr. Whelpley when the proposed committee was to report, and Mr. Whelpley replied at the next annual meeting.

Thereupon the Chair put the vote upon the motion as proposed by Mr. Whelpley, and it was adopted, and the Chair announced the appointment of Mr. Wilbert upon this committee of one.

Mr. Whelpley said that this reference to the city of Washington reminded him of a letter that he had received, which he thought would be of interest to the Association, from ex-treasurer Sheppard, who had asked him to extend to the members present his greetings. In this letter he had inquired about the progress of the General Endowment Fund of the Association, concerning which Mr. Whelpley made the statement that this fund now exceeded the sum of \$5,000, but must reach the sum of \$25,000 before the Association could make use of the interest upon it, the interest

then being available only for general expenses, and not for any special purpose, such as the matter in hand. This \$5,000 had been practically contributed by three men. He said Mr. Sheppard had requested him to lay special stress upon the fact that contributions of from one dollar up would be acceptable, and he expressed the hope that before the members left for their homes he should be able to add a number of one-dollar contributions to the fund.

The next report called for was that of the Committee on Wm. Procter, Jr., Monument Fund, and Chairman Hancock made a verbal report showing progress. He said that for the last two years very little had been done; that there was in the treasury of this fund at the present time the sum of \$3,666.83, and that pledges received would run this up to something over \$4,000. Mr. Hancock then went at length into a statement of the prospects of the fund and the various means and devices, such as working through the State Associations, the sale of Procter buttons, etc., by which it was hoped to raise the desired amount in the next few years, so that the monument in contemplation might be erected and unveiled at least by the year 1917, the 100th anniversary of the birth of Procter.

Mr. Whelpley moved that the Chairman of the committee be furnished with a list of delegates to the State Associations, so that he might correspond with them and get up an organization for the furtherance of this fund. The Chair stated that it was hardly necessary to put this in the shape of a motion, and that he had no doubt the Secretary would be glad to furnish the Chairman with such list. The Secretary responded that the Association had no such list of delegates to the Association, but Mr. Whelpley said there was a motion to appoint them.

Mr. Hancock stated that at the meeting in New York the committee was empowered to enlarge itself, and asked if that was still the understanding, and the Chair replied in the affirmative.

The Chair called for the report of the Committee on Publicity as the next business in order, and Chairman Hays gave a brief verbal abstract of the committee's report, the full text of his report being as follows:

REPORT OF THE COMMITTEE ON PUBLICITY.

To the Officers and Members of the American Pharmaceutical Association:

Early in his administration President Rusby reappointed the old Committee on Publicity, consisting of Messrs. Caswell A. Mayo, Harry B. Mason, and the undersigned as Chairman.

Under date of October 11, 1909, he addressed the following letter to the members of this committee:

NEWARK, N. J., October 11, 1909.

To the Members of the Committee on Publicity of 1908-1909:

Will you kindly take into consideration the following suggestions concerning the relations of the work of your committee to that of some of the other committees of the Association.

The most perfect analysis of the situation that I have been able to make shows clearly

that the success of the Association depends directly upon the individual activities of the members, and is to a great extent proportional to the number of members. It is for this reason that I purpose devoting my special efforts as president to increasing the membership. No other influence can so greatly tend in this direction as the establishment of local branches. Successful work by the Committee on Publicity will exert a most favorable influence upon the establishment of such branches. It is of further great interest to your committee that by the plan that I shall suggest below, the establishment of the proposed local branches will develop entirely new opportunities for successful work by you.

I have carefully studied Chairman Hays' report and think that he has correctly diagnosed the causes of the failure of your committee to accomplish greater results.

The first cause as stated by him is the absence of means (funds) for carrying on the necessary work of the committee. Concerning this obstacle, I suggest a method of performing the work without incurring expense so that it will cease to be operative.

The second cause assigned is an absence of interest and co-operation on the part of the members of the Association. This difficulty is inherent in human nature and your committee cannot hope, any more than other workers, to escape its influence; yet, if all workers were to assign it as a valid reason for ceasing effort, no work could ever be accomplished. This difficulty must be met and overcome. In my opinion, the way to overcome it is to increase the number of, and to properly distribute those who are officially charged with the work and shall have willingly accepted its responsibility.

The third difficulty assigned depends almost wholly upon the two former, and will to that extent disappear with their removal.

With the above thoughts in mind, you will understand my hope, and I trust share it, that a more or less favorable result will follow from the plan indicated in the communication of which I enclose a copy. It is my intention to manifold this at my own expense and to send a number of copies each to persons in the leading towns and cities who are my personal friends and friends of the Association, and ask them to mail them to the leading newspapers, paying the small amount of postage involved. This will so distribute the expense for postage that no one will feel it. The reading and tabulation of the replies will be light work if the Committee on Publicity will share it.

In case the results prove disappointing, which is of course very possible, some good will at least have been done in bringing our Association to the attention of those editors. This benefit will amply repay the effort involved and will certainly make it easier for future operations to succeed. It is publicity work of a good sort. In that case, we can report the matter and let it drop. On the other hand, the responses may be so favorable as to justify acting on the proposed plan, or some modification of it, in which case the Committee of 1909-10 will score a great success and pave the way for important future results.

I write this to ask your candid opinion concerning the desirability of taking this action, concerning the propriety of making it the action of your committee; I'm merely acting as your aid, on the principle that the President is a member of all committees.

Finally, I would ask if you are willing to continue as a member of this committee during the coming year.

I have had a long conversation with Chairman Hays, who approves of the plan proposed and also of continuing the membership unchanged, except for additions. I should like to have Dr. Whelpley and someone in the far west, perhaps Prof. Johnson of Seattle, added to the committee.

Will you be so kind as to send me a reply promptly, as the shortness of the current year necessitates prompt organization.

Very truly yours,

(Signed)

H. H. RUSBY, *President.*

As intimated in the foregoing letter, President Rusby enlarged the Committee by adding to it Messrs. Henry M. Whelpley and C. W. Johnson. The president has not contented himself by appointing others to do the publicity work of the association, but has himself been a most earnest, active and valuable member of the committee.

The communication to which he refers in the foregoing, and of which he sent out about 200 copies to friends throughout the country, reads as follows:

October 9, 1909.

Dear Sir: This letter is written to many of the leading newspapers of the country, to inquire whether they would consider it of advantage to them to be able to consult, on such pharmaceutical matters as they may from time to time be compelled to consider, with local committees of this Association, appointed for the purpose. In submitting your reply, will you kindly consider the following facts:

This Association, unlike the National Association of Retail Druggists, that of Wholesale Druggists, the National Proprietary Association and similar bodies, is not primarily interested in the business side of pharmacy. Although it maintains a working section on commercial interests, its primary objects are scientific, educational and professional, its other sections being on Scientific Papers, Education and Legislation, (professional) Pharmacy and Dispensing and Historical Pharmacy. It has numerous committees engaged in similar lines of work. Its object is thus to combat the domination of commercialism and to improve the character, as well as the standing of the profession.

It is unfortunate for the public, as well as for the general standing of our own profession, that the press of the country generally has not recognized this important element in pharmacy, nor the steady, and of late great progress that it has made in education, legislation and general practice and in the abatement of abuses. It has been the custom of newspapers to be guided by the superficial appearances in pharmacy and to ignore the essential professional tendency. Thus the grossest errors have been made in reporting, and especially in discussing such matters. It is the belief of the writer that if there were a committee in each important locality that represented the best knowledge, judgment and intent of this Association, whose business it should be to hold themselves in readiness to respond to calls for information from the local press, much good would result to all concerned. The personnel of such a committee could be made acceptable to the journals interested before appointing. Journals would in no wise be bound to accept the committee's views but would have the benefit of their knowledge and advice, which should prove of considerable value.

Should the replies to this letter indicate sufficient interest and approval of the proposition submitted, I will recommend suitable action at our next meeting, to be held on the fifteenth of May, in Richmond, Va.

Trusting you will favor me with an expression of your opinion,

Very truly yours,

(signed) H. H. RUSBY, *President*

To this letter he received an even dozen replies by mail, as well as oral responses through representatives of two New York papers, the Times and the World. A summary of these replies, together with some comments made upon them by President Rusby, follows:

NEWARK, N. J., *April 18, 1910.*

SUMMARY.

Pittsburg Gazette Times. Glad to have our services.

Portland (Me.) Evening Express. Will be very glad to consult.

Nashville American. City too small.

Cincinnati Inquirer. Thinks it of no particular value.

Wilmington (Del.) Evening Journal. Will be glad to have benefit.

Houston Daily Post. Have never found such necessity.

Ogden (Utah) Evening Standard. Does not understand, but if information of public benefit, glad to publish it.

Detroit Journal. Idea admirable, as it insures accuracy.

Chicago Evening Post. Glad to consult.

Atlanta Georgian. Hardly has any use, but favors plan.

Minneapolis Journal. Suggestion good one and glad to have advantage.

Boston Globe. Does not think it feasible.

New York World. Glad to have benefit.

New York Times. Just what is needed by papers and will be wanted when they understand it.

I will now state it as my opinion that the plan is practicable. These papers do not yet understand the nature or full measure of our possible assistance. It is not a plan which could be expected to yield large immediate results but they would steadily increase. If we had an energetic representation in a given city, it would become known to the pharmacists of that city as well as to the newspapers and would thus be of great benefit to our Association as well as to the profession. When any question came up between a pharmacist and the public, or between him and a paper, either could appeal to our sub-committee. If the latter found itself called upon to submit a statement to the press, its relation to our Association would give it standing, and the result could not fail to be good. Furthermore, statements are constantly appearing in the newspapers on botanical, chemical, toxicological and similar subjects having pharmaceutical relations. Pharmacists noticing errors in these could communicate them to our sub-committee which could report them to those papers which had previously agreed to recognize it, under such a caption as "pharmaceutical information corrected." Our sub-committee could also extract similar criticisms which frequently appear in the pharmaceutical press and submit them to those journals which had agreed to accept our services. It is very certain that after a time other papers, especially those that were criticized, would see that the others were gaining credit for correctness in such matters and were becoming mentors to them.

At the same time that we and our work were thus becoming known to and appreciated by the press, the same thing would be happening to the pharmacists of the various sections, and this would tend to bring them into our Association.

I feel very sure that progress by such an organization as I have suggested would be sure and sound and would establish a new basis for the strength and growth of our Association.

On November 6th our President sent out a general letter to the chairman of his various committees. That portion of it of especial interest to the committee is here quoted:

"The Committee on Publicity will have important work to do in arousing public interest and demand for necessary legislation, and should have a sub-committee in every place where legislation is to be enacted. This committee has already received a communication from the President, suggesting a plan of action, in this direction, which every member of the committee has approved."

Acting under the stimulus of President Rusby's example and encouraging word, the chairman of the Committee, on December 3d, dispatched to each of his associates a letter similar to the following:

Dear Sir: In the report of the chairman of the committee on publicity made at the recent meeting of the American Pharmaceutical Association, three reasons or excuses were given for the unsatisfactory results of five years of labor by this committee, namely (1) lack of funds, (2) want of cooperation on the part of members, and (3) the seeming indisposition of the public press to concern itself with the affairs of pharmacy.

President Rusby is exceedingly desirous that the publicity committee accomplish something worth while during his term, and has appointed as such committee, yourself [Mr. Mayo], Mr. H. B. Mason, Dr. H. M. Whelpley, Prof. C. W. Johnson and the undersigned, the latter as Chairman. He thinks that by dividing the work among five members, to be further divided by these five among a much larger number, the question of expense will become so attenuated as almost to disappear, and that the other difficulties mentioned will be largely overcome. President Rusby is deeply in earnest about the work of the Association this year, and has inspired me with a determination to make our committee present a better showing at Richmond next May than it has ever been able to make before. That you will do what you can to bring about that end your record as an A. Ph. A. worker leaves no doubt.

The plan of campaign is as follows: The territory to be covered by our operations has been divided into as many parts as there are members of the committee, and we desire each member to request some loyal A. Ph. A. man in each town and city in his territory to act as his deputy and do the actual work of securing the proper kind of newspaper publicity for pharmacy in his town or city and its tributary country. If well done this work will not only arouse public interest in pharmacy and thus make desirable legislation easier, but will impress upon druggists the fact that the A. Ph. A. is accomplishing something for them, and so will attract members to its fold.

The territory assigned to you is the _____ section, consisting of the States of _____.

Of course you will know the best men to approach in this territory and how to approach them. Just as a suggestion, I am enclosing herewith copies of two letters written by President Rusby. You perhaps have already seen these, but it will do no harm and be a convenience for you to have them at hand just now.*

Strong local pharmacists can exert a greater influence over the newspaper men than can President Rusby or any other man in whom they have not even a remote interest, but the local men must be reminded of their duty and opportunity now and then or they will forget the one and neglect the other. Such local men are in a position to watch the papers, detect anything in them that reflects unjustly upon pharmacy, and to write to the papers letters having the authority of the American Pharmaceutical Association, for the purpose of correcting the wrong impression; they can take the initiative in laying before the public such things regarding pharmacy and the work of our Association as may redound to the benefit of the one and the credit of the other; and they can perform the services mentioned in President Rusby's letters.

Your work as a member of this committee is to appoint the local men for your territory and keep them reminded of what is expected of them, and to report the results of your and their labors to the Chairman. I trust that you will be able to inform me soon that you are "on the job," and that you do not intend to let your appointees rest until they have reported actual accomplishments to you and not even then, until the Richmond meeting. It is especially desirable that some live member at Washington and the state capitals be interested in this campaign, and wherever there are local branches their services should be enlisted too. We ought to have a scrap book full of clippings to show at the next meeting as a result of our efforts. I should be glad to have you communicate to me any idea for furthering this work that may occur to you, and I promise to pass the same along to the other members of the committee.

The time for activity is short. Let's start something, and start it soon and with a rush.

Yours very truly,

(Signed) FRANCIS B. HAYS.

To Mr. Johnson was assigned the territory made up of North Dakota, South Dakota,

* The letters referred to are given above.

Wyoming, Colorado, New Mexico, Washington, Oregon, California, Idaho, Nevada, Utah, Arizona, Montana, Alaska, Hawaii, and the Philippine Islands.

Mr. Whelpley's territory consisted of Nebraska, Kansas, Oklahoma, Texas, Iowa, Missouri, Arkansas, and Minnesota.

Mr. Mason's was Ohio, Indiana, Illinois, Michigan and Wisconsin.

Mr. Mayo's was Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Kentucky, Tennessee, Cuba and Porto Rico.

The Chairman took New York, New Jersey, the New England States and Canada.

Form letters were sent out to the druggists in his territory by each of the members of the committee, that mailed by Mr. Mayo and the Chairman being the same except as to the signature. Copies of all these are here given:

February 1, 1910.

Fellow Member of the A. Ph. A.: There is much work for the American Pharmaceutical Association to do. There is much work for its Committee on Publicity to do. There is much work for each of its individual members to do. Doubtless you as an active and loyal member of the Association would be glad to know how you can do more work for the organization. One way is by coöperating with the Committee on Publicity. This you can do without very much effort.

By way of explanation I may say that this Publicity Committee was created several years ago, but has never accomplished much. Its Chairman last year gave three reasons for this want of material accomplishment: one being lack of money, another, seeming lack of interest in pharmaceutical matters on the part of the daily press, and the third, lack of coöperation with the committee on the part of the members at large. At first President Rusby was inclined to discontinue the Committee on Publicity, but upon further consideration he devised a plan which he thought might overcome the three difficulties encountered by the Association's publicity promoters in former years, and appointed a committee of five to help put this plan into execution. The country has been divided into five sections, each one of which is in charge of a member of this committee. You are in my section. Each member of this committee is to appoint as many sub-committeemen as he sees fit, and these are expected to get in touch with the daily papers published in their territories, respectively, for the purpose of getting the desired kind of publicity for the Association. What a subcommitteeman's territory is he can judge by studying the lists in the back of the A. Ph. A. Proceedings in which the states and towns of our members are given. If two members lap over into each others' territory, no harm will be done.

This plan, as you see, so divides the expense (for postage, etc.) of the committee that it will not fall heavily upon anybody, and thereby does away with the need for funds; it is devised to bring a local influence to bear upon the daily press which ought to result in awakening its interest in pharmaceutical matters; and we trust that you and others who are appointed sub-committeemen will see that the third object disappears automatically.

So much for the general plan. Now to get down to particulars as to what you, who are hereby appointed a sub-committeeman, are expected to do. We want to show to the public that the drug business is not what the usual newspaper joke or news item would lead readers to suppose; we want to defend the good name of druggists in cases in which it can be defended and to let the public know that the black sheep in the business not only are not representative of, but are not in good fellowship with the others; we want to watch the papers for attacks on the drug business and by doing what we can through the papers to repulse these attacks, to raise the business in the estimation of the public and to raise the work of the American Pharmaceutical Association as a practical, neces-

sary body, in the estimation of those druggists who now seem to regard it as being of no value to the rank and file. For instance, suppose one of the newspapers in your territory should charge that the drug business is merely a cloak for the sale of liquor. It would then be an opportune time for you to write a letter to that paper and quote the resolution adopted by the A. Ph. A. against the illegal sale of liquor in drug stores (Proceedings for 1908, page 535). There are lots of ways in which you can render valuable aid to pharmacy and the Association through your local newspapers which will occur to you from time to time, and which it is not necessary that I should point out to you in detail now. By combining the name of the Association with your own in this work you can probably exert more influence than if you acted simply in your personal capacity, and by thus utilizing your services the Association will be getting work done which it could not accomplish in any other way.

I should be glad to have you promise that you will undertake this work, and to have an account of all that you do—together with press clippings and copies of your letters—to be embodied in the report of our chairman to the meeting of the Association to be held at Richmond, Va., May 2d to 6th.

You may feel that what you may be able to accomplish will hardly be worth while, but just think what an influence for good will be exerted if work of this kind is undertaken in every city, town and village in the country in which we have a member. And, as President Rusby says, even if we do not accomplish what we want to, we shall at least be doing preliminary work which will make it easier for those who are to follow us to do more, and we shall be letting the newspapers know that there is such a thing as the A. Ph. A., and that it is a militant organization of those who regard the practice of pharmacy as something better than dealing in questionable merchandise.

Fraternally yours,

CASWELL A. MAYO.

THE BULLETIN OF PHARMACY.

DETROIT, MICH., *December 15, 1909.*

Dear Sir: President H. H. Rusby, of the American Pharmaceutical Association, has planned to make his administration one of great aggressiveness and value. He has called upon the Committee on Publicity for certain definite work, and it is in my capacity as a member of this committee that I am approaching you.

You have been appointed the representative of the Committee on Publicity for your city, and I trust that you will give us hearty co-operation. What is there for you to do? This:

Watch the newspapers whenever they touch upon any subject affecting pharmacy. If you detect things which reflect unjustly upon our profession, correct the situation at once by writing letters for publication having the authority of the A. Ph. A. behind them. More than this, take the initiative in laying before the public, through the medium of your local newspapers, such things regarding pharmacy and the work of our Association as may redound to the benefit of one and the credit of the other.

This isn't much, and I hope you will be willing to do it. The American Pharmaceutical Association is the great conservator of professional and ethical pharmacy in the United States. Its noble work for the benefit both of the profession and the public ought to be more widely known among the people generally. The Association ought also to get more credit among druggists themselves for services accomplished.

You will help us attain these objects if you will kindly take your appointment seriously and endeavor to assist us in the manner indicated. In a word, write a letter for publication to your local newspapers whenever the occasion presents itself to you, and in these letters do not fail to set forth the worth and the dignity of pharmacy and the uplifting work accomplished by the American Pharmaceutical Association.

Finally, will you please send to me clippings of all such letters, in order that I may

turn them over for permanent preservation in the archives of the Committee on Publicity. The committee is anxious to render a ringing report at the Richmond meeting next May. We need your co-operation. May we count on it?

Very cordially yours.

Dear Sir: The Committee on Publicity of the A. Ph. A. has as its prime object the establishing of a better understanding between the public at large and pharmacists, so that the customers of the retail drug trade will understand the nature of the calling which is designated as "pharmacy." You must have realized before now that the newspapers do not always give pharmacy credit for the position which it holds in the affairs of a community. The calling is often misrepresented.

I am a member of the General Committee on Publicity, and have been requested to appoint associate members in this section of the country. I have selected you because I know of your interest in pharmacy and your ability in making "crooked things straight," and I hope that you will straighten out the public opinion of pharmacists.

This you can do by getting in touch with as many editors as possible who control the expressions in Nebraska newspapers. Notify these editors to consult you on pharmaceutical matters before they rush into print with their expressions.

In cases which justify it I suggest that you write newspapers communications for publication, commenting on misleading statements in regard to pharmacy which you see in print. In doing so you are at liberty to sign your name as a member of the A. Ph. A. Committee on Publicity.

A second object of our committee is to promote the welfare and influence of the A. Ph. A. This you can accomplish by talking the A. Ph. A. to your associates at conventions. This should be done in both local and state meetings.

I suggest that you send direct to the Chairman of our committee, Francis B. Hays, 100 William St., New York City, either the original or copies of the letters which you receive from editors and clippings from newspapers when articles are published relating to pharmacy.

I trust you will write me freely after you have studied the situation. The work of this committee is necessarily very much like advertising. It is difficult to measure the net results by any known standard, but we are anxious to submit a proof at Richmond which will show that the committee has been active and made the best of its opportunities.

Very truly,

UNIVERSITY OF WASHINGTON.

School of Pharmacy, CHARLES W. JOHNSON, PH. C., PH. D., DEAN.

UNIVERSITY STATION, SEATTLE, WASHINGTON.

Dear Sir: The committee on publicity of the American Pharmaceutical Association is trying to cover every section of our country this year to bring the association to the attention of every druggist and others who are interested. To do this the work of the committee is divided into sections. You are located in my territory and I would like to ask you to do what you can to further the interests of the association in your community. Some of the points which you may be able to cover are as follows:

1. See that the newspapers of your community report items concerning pharmacy correctly. Should misstatements occur in the papers you should endeavor to have correction made and the position of the A. Ph. A. made clear on the point involved.
2. If you have a druggists association in your city you should bring the work of the A. Ph. A. to its attention and try to get all druggists sufficiently interested that they will become members.
3. In the same way speak to the physicians and give them an outline of what is being done by the association in its various sections and lines of work.

You may think that you can accomplish very little that will be noticeable but if every A. Ph. A. member would do something along this line our association would soon be of much greater power than it is today. I trust that you may be able to give the association a part of your time and that you will solicit the aid of other druggists along this line.

Respectfully,

Member of Committee on Publicity, American Pharmaceutical Association.

F. B. HAYS, NEW YORK, N. Y., *Chairman of Committee.*

February 1, 1919.

Fellow Member of the A. Ph. A.: There is much work for the American Pharmaceutical Association to do. There is much work for its Committee on Publicity to do. There is much work for each of its individual members to do. Doubtless you as an active and loyal member of the Association would be glad to know how you can do more work for the organization. One way is by coöperating with the Committee on Publicity. This you can do without very much effort.

By way of explanation I may say that this Publicity Committee was created several years ago, but has never accomplished much. Its Chairman last year gave three reasons for this want of material accomplishment, one being lack of money, another, seeming lack of interest in pharmaceutical matters on the part of the daily press, and the third, lack of coöperation with the committee on the part of the members at large. At first President Rusby was inclined to discontinue the Committee on Publicity, but upon further consideration he devised a plan which he thought might overcome the three difficulties encountered by the Association's publicity promoters in former years, and appointed a committee of five to help put this plan into execution. The country has been divided into five sections, each one of which is in charge of a member of this committee. You are in my section. Each member of this committee is to appoint as many sub-committeemen as he sees fit, and these are expected to get in touch with the daily papers published in their territories, respectively, for the purpose of getting the desired kind of publicity for the Association. What a sub-committeeman's territory is he can judge by studying the lists in the back of the A. Ph. A. Proceedings in which the states and towns of our members are given. If two members lap over into each others' territory, no harm will be done.

This plan, as you see, so divides the expense (for postage, etc.) of the committee that it will not fall heavily upon anybody, and thereby does away with the need for funds; it is devised to bring a local influence to bear upon the daily press which ought to result in awakening its interest in pharmaceutical matters; and we trust that you and others who are appointed sub-committeemen will see that the third obstacle disappears automatically.

So much for the general plan. Now to get down to particulars as to what you, who are hereby appointed a sub-committeeman, are expected to do. We want to show to the public that the drug business is not what the usual newspaper joke or news item would lead readers to suppose; we want to defend the good name of druggists in cases in which it can be defended and to let the public know that the black sheep in the business not only are not representative of, but are not in good fellowship with the others; we want to watch the papers for attacks on the drug business and by doing what we can through the papers to repulse these attacks, to raise the business in the estimation of the public and to raise the work of the American Pharmaceutical Association as a practical, necessary body, in the estimation of those druggists who now seem to regard it as being of no value to the rank and file. For instance, suppose one of the newspapers in your territory should charge that the drug business is merely a cloak for the sale of liquor. It would then be an opportune time for you to write a letter to that paper and

quote the resolution adopted by the A. Ph. A. against the illegal sale of liquor in drug stores (Proceedings for 1908, page 535). There are lots of ways in which you can render valuable aid to pharmacy and the association through your local newspapers which will occur to you from time to time, and which it is not necessary that I should point out to you in detail now. By combining the name of the association with your own in this work you can probably exert more influence than if you acted simply in your personal capacity, and by thus utilizing your services the association will be getting work done which it could not accomplish in any other way.

I should be glad to have you promise that you will undertake this work, and to have an account of all that you do—together with press clippings and copies of your letters—to be embodied in the report of our Chairman to the meeting of the association to be held at Richmond, Va., May 2d to 6th.

You may feel that what you may be able to accomplish will hardly be worth while, but just think what an influence for good will be exerted if work of this kind is undertaken in every city, town and village in the country in which we have a member. And as President Rusby says, even if we do not accomplish what we want to, we shall at least be doing preliminary work which will make it easier for those who are to follow us to do more, and we shall be letting the newspapers know that there is such a thing as the A. Ph. A. and that it is a militant organization of those who regard the practice of pharmacy as something better than dealing in questionable merchandise.

Faternally yours,

FRANCIS B. HAYS.

Mr. Whelpley wrote that he did not use the same form letter in all his correspondence, but that the general form he sent covered all points he has tried to make in writing to his sub-committee men. Of course a special personal communication is much better than a form letter.

The chairman sent a copy of the form letter of each member of the committee to all the other members.

Members have doubtless already seen the letter from the chairman published in our Bulletin for March, page 137, a copy of which is attached hereto:

AN OPPORTUNITY FOR EFFECTIVE AND PROFITABLE PUBLICITY WORK.

100 WILLIAM STREET, NEW YORK, *February 24, 1910.*

To A. Ph. A. Members:

There has never been a better time than right now for members of the American Pharmaceutical Association to do a little effective publicity work for themselves and the Association. The *Journal of the American Medical Association* is opposing certain unethical practices on the part of some druggists, suggesting that physicians discipline the persistent offenders by using a very persuasive means easily within their reach.

It would be of service to pharmacy if every member of the American Pharmaceutical Association would let it be known through the newspapers that the Association is not in sympathy with any unethical practices on the part of druggists, and that no loyal member of the Association indulges in them. This may be done in the larger cities through the correspondence columns of the papers, while in the smaller places personal interviews with the editors might prove more effective.

Pharmacy can not afford to let this latest attack upon its votaries go unchallenged, and the member of the American Pharmaceutical Association who can and does show that so far as he is concerned it is unwarranted, will by so doing not only aid in raising pharmacy and the association in the estimation of physicians and the public, but will be doing himself a good turn which ought to pay him in dollars and cents.

FRANCIS B. HAYS, *Chairman A. Ph. A. Committee on Publicity.*

As to results, we wish it were not necessary for us to speak, as they seem to be so inadequate, considering the voluminousness of the report of what has been done to achieve them. Still, bread cast upon the waters has been known to show itself again after many days, and with a goodly increase. Work of a more persistent and methodical nature than the members of this committee have the time to do, would doubtless show greater achievement than we are able to report.

But there have been some returns. President Rusby is encouraged by the results of his campaign, and the members of the committee report that they have seen some effect of their labors.

From the nature of the work of this committee, its report is necessarily a one-man paper.

FRANCIS B. HAYS, *Chairman of the Committee on Publicity.*

RICHMOND, VA., May 7, 1910.

Mr. Payne complimented the committee upon the good work it had done, and said he did not know why it was, but had noticed that the papers in his State had made very nice notices.

Mr. Whelpley related an amusing experience he had had in dealing with the daily press in St. Louis in this behalf, and the Chair spoke of his experiences in New York City, and related the circumstance of a representative of one of the daily papers calling on him and making the statement that they were often called on to write something and didn't know what to write, and if they could get information from such a society as this, they would take their advice.

Mr. Francis moved that the Association express its obligation and appreciation of the many courtesies shown in the report of the operations of this society by the daily press of Richmond, and that notification be sent to the editors of each of the Richmond papers of such action. This motion was seconded by Mr. Mayo and carried.

The Secretary called for the report of the Delegates to the National Wholesale Druggists' Association, stating that he had not received their response. There was no response.

The Secretary called attention to the fact that a motion had been made by Mr. Hynson to amend Articles II and V of Chapter IX of the By-Laws, and also Article I of Chapter X. These proposed changes were necessary to carry into effect Mr. Hynson's motion to change the name of the Section on Commercial Interests to that of Section on Ethics and Practice, provided said motion prevailed. He said that Mr. Hynson had requested him to suggest that this matter be referred to the Council—not to be adopted, but referred to the Council.

Mr. Holzhauer said he hoped this would be voted down. He thought it was out of the question to change the name of the Section on Commercial Interests to that of Section on Ethics and Practice, for the pharmacists interested in commercial matters would never think of going to a section bearing the latter name to hear commercial matters discussed. He called for a vote on this proposition.

Mr. Hallberg moved to refer to the Council, with an expression of disapproval on part of the Association, and this motion was seconded by Mr. Wilbert.

Mr. Mayo thought a motion to amend the By-Laws could not be disposed of in the way proposed by Mr. Hallberg—that all such motions must be acted upon by the Association.

The Chair stated that as the matter now stood, there was no motion to adopt. Thereupon Mr. Whelpley so moved, and was duly seconded.

Mr. Ford moved as a substitute that this motion to amend the By-Laws be not adopted, and Mr. Whelpley seconded this motion. The Chair put the vote on the Ford motion, and it was carried unanimously, and the Chair declared the motion to amend the By-Laws had failed.

Mr. F. B. Hays presented his report as Reporter to the Public Press, as follows :

REPORT OF THE REPORTER TO THE PUBLIC PRESS.

To the Officers and Members of the American Pharmaceutical Association :

Richmond papers have handled the news of our meetings better than those of any other city in which we have met during the five or six years that we have had a reporter to the public press. In Indianapolis, in 1906, one paper did very well indeed; in 1907, New York hardly found out that we were within her ample walls; at Hot Springs the following year the newspapers were like the beggar in the story, who would take the corn if it were shelled—they were willing enough to print what your reporter gave them, but seemed to have no facilities for getting the news; last year the Los Angeles papers treated the Association in a more or less sensational way, and not methodically.

There are four daily papers in Richmond, one morning and three afternoon. Your reporter called upon the city editor of each of them the first thing after reaching the city Monday morning, and was most courteously received. He invited these editors to send reporters to the meetings and have them call upon him for any assistance they might need. He also gave to each of them a different short preliminary "story" as to the scope and object of our Association, which in each instance was published before our opening session.

All the papers had active and competent men attending our meetings each day, and have featured their accounts of our proceedings almost every day on their first pages, as members have doubtless noticed.

What the Associated Press and United Press have done your reporter does not know, as he has not followed the out-of-town papers during the meeting.

The four Richmond daily papers—the *Times-Dispatch*, the *News Leader*, the *Evening Journal* and the *Virginian*—are entitled to our thanks for their liberal and just accounts of our proceedings.

A complete set of clippings from these papers has been made by your reporter and will be turned over to the historian.

Respectfully submitted, FRANCIS B. HAYS, *Reporter for the Public Press.*

RICHMOND, VA., May 7, 1910.

The Chair stated that, so far as he knew, there was no more business to come before the Association at this meeting.

Mr. LaWall, of Philadelphia, stated that, in connection with the report

of the Committee on Reorganization, he had a set of resolutions he wanted to offer, though he did so with some diffidence, for fear it might precipitate a discussion. He thought it was a matter which was of vital interest to the work of the Association, however, and he would like to present them :

Resolved, That the Committee on Reorganization of the A. Ph. A. take into consideration a plan by which :

1. The sessions of the various sections after having been assigned a certain time be not interfered with by simultaneous council meetings.

2. That no general social functions be scheduled for hours assigned to general or section programs.

3. That a uniform plan of procedure be provided by which each section is authorized to proceed according to the order of the program for any particular session, any unread papers to be deferred until the completion of the program arranged for the subsequent session.

4. That some satisfactory method of signaling the opening of sessions, either by megaphone, trumpet or bugle call, be adopted.

5. That a method of announcing, by blackboard or similar notice, to members in attendance at each simultaneously occurring session, the titles of papers which are being read at all of the other simultaneous sessions.

Mr. Wilbert moved to refer to the Committee on Reorganization, for consideration and report next year, and this motion was seconded by Mr. England and carried.

Mr. Payne stated that before the Association adjourned, he wanted to offer a resolution that a standing vote of thanks be extended to the Local Secretary, his assistants, and all of the pharmacists of the city of Richmond, their families and friends ; the Governor, Mayor and other officials, and the press, for their uniform kindness and many courtesies shown the members of the Association during their stay in Richmond. There were several seconds to this motion. Mr. Mayo stated that, in seconding this motion, he felt that words could not express the pleasure that many of the members had experienced in this meeting at Richmond. He did not know of any occasion when all the members had so thoroughly enjoyed themselves, and the only drawback had been that the stress of business had been so great that some of the members had been deprived of the pleasure of participating in the entertainment features that had been provided so bountifully. He was sure that every member, and every lady in attendance, had a delightful time.

Mr. Hallberg also seconded the motion, and said he thought the Association should be especially thankful to the Local Secretary and the Committee of Arrangements for not interfering with the business of the Association. Mr. Wilbert endorsed this sentiment.

Mr. Roehrig moved that the hotel management also be included in this vote of thanks, and Mr. Payne gladly accepted the amendment. The Chair stated he was very glad to hear the suggestion, for the management certainly deserved it.

Mr. Payne's motion as amended was then put to a vote and carried unanimously.

The Chair stated that before calling the newly-elected President to the Chair, he wanted to express his own very hearty thanks to the workers of the Association for what they had done during the year just closing. He said it was feared at first that the work of the year would be curtailed, because of the short time since the last annual meeting—only some nine months—but he had called on the various committees and workers to take that fact into consideration and “get busy,” and they had responded generously, as was evidenced by the great amount of work accomplished. This work had been done at great personal sacrifice in many instances, and he wanted to thank those who had done it so well.

The Chair then called on Mr. Payne and Mr. Day to act as a committee of escort to conduct the President-elect and other officers to the rostrum, that they might be duly installed into the offices for which they had been selected.

These gentlemen performed this duty handsomely, and first escorted to the Chair President-elect Eugene G. Eberle, of Dallas, Texas, whom Mr. Payne, introduced as “a remarkable man from a remarkable State—Mr. Eberle, of Texas.” (Applause.)

Mr. Eberle expressed his hearty appreciation of the honor paid him in his election to the office of President, and said he would endeavor during the year to handle the business of the Association that came to him with the greatest care possible, and would be appreciative of any assistance or advice that might be given him by the members. He begged that they would not hesitate to communicate with him at any and all times about Association matters, and assured them they would have a respectful hearing. Mr. Eberle stated that he thought the Association had entered upon a new era: that while the work that had been done in the past, and the tremendous amount of work that had been done at this meeting, after so short a space of time since the last meeting, was remarkable and highly encouraging; he was especially gratified at the culmination of a movement that many, and perhaps most, of the members had been looking forward to for some years past, namely, the establishment of a *Journal* of this Association. He felt that this would result in a material increase of the membership of the Association. It was something that would appeal to prospective members—far more so than the annual Proceedings, necessarily so long delayed in transmission; for they would at once see the value of such a *Journal*. He was very hopeful of its effect. Mr. Eberle said it was his purpose to give a large part of his individual effort towards an increase of membership, especially throughout the Southern States, where the membership was rather light. He commended the passage of a resolution at this session, authorizing the President to appoint a special representative at the annual meeting of each State Association, to speak

for the American Pharmaceutical Association, and take up this matter of membership in a systematic way. This method had already been adopted in Texas with good effect, and he had no doubt it was true of others of the states, but he thought it highly desirable to extend it to all State Associations. He also thought it would be a good idea to get in touch with the graduates of the various schools of pharmacy, and put copies of the *Journal* of the Association in their hands. Mr. Eberle again expressed his thanks to the Association, and hoped that when his year of service was ended, he would still be found worthy of that high esteem in the eyes of the members indicated by his selection for the office of President. (Applause.)

The Chair, suiting the action to the word, said it afforded him great pleasure to pin the badge of the President upon Mr. Eberle's coat, this being the second time Mr. Eberle had worn this badge of honor in the past year, as, in the capacity of First Vice-President, he had presided at the Los Angeles meeting last year, by reason of the enforced absence of President Oldberg. "Look out that you do not have a dictator!" said Mr. Rusby.

The Chair then introduced Vice-President William B. Day, of Chicago.

Mr. Day assured the members of his high appreciation of the honor conferred upon him in naming him for First Vice-President, and said he would do all that he could to promote the interests of the Association in every way possible during the coming year.

Second Vice President Otto F. Claus, of St. Louis, was not present, but Mr. Payne, of the committee, introduced Mr. L. E. Seltzer, of Detroit, the Third Vice-President-elect to the Association.

Mr. Seltzer said he thought it went without saying that the Third Vice-President should be seen and not heard, but that he simply wanted to take this opportunity to thank the members for the recognition they had given him, however undeserved.

The Chair announced that the next officer-elect to be introduced to the Association was Treasurer Whelpley, who had succeeded himself. Mr. Payne introduced the gentleman.

Mr. Whelpley said that he had been so interested in the initiatory ceremonies that he had entirely forgotten that he himself was on the program to be installed. But he recalled especially the remarks of the President-elect, Mr. Eberle, to the effect that his efforts during the coming year should be largely in the direction of securing new members. It was the duty of the Treasurer to spend a large part of his time and energies in the direction of retaining old members, and much of his work had been directed to that end. He desired to especially thank the members in different parts of the country whose hearty co-operation with his efforts had resulted in saving many members to the Association who would otherwise have been lost; and he was pleased to see it demonstrated that all over

this country the Association had members who were anxious and willing to assist in this work. Some of the most pleasant experiences he had had during the year were in the responses from members who had expressed their willingness to co-operate with the Treasurer in this direction. Continuing, Mr. Whelpley said that the care of the special funds of the Association, which now had reached nearly to the sum of \$30,000, was one that demanded considerable attention on the part of the Treasurer and the Special Committee on Invested Funds. He said that the future prosperity of the Association along enlarged lines would be possible through these special funds, and he could see now why former Treasurer Sheppard laid so much stress on this feature of Association work. Now at the close of his second term as Treasurer, he realized many things that he did not understand before, and realized why Mr. Sheppard always paid such close attention to everything that was proposed that meant expense to the Association, and why he took a special interest in everything that meant new members. He wanted to repeat what he had said last year at Los Angeles, that the greatest inspiration he had had for his work in the Treasurer's office was the record of his able predecessor.

The Chair stated that the next officer to be installed was the veteran Reporter on the Progress of Pharmacy, Mr. C. Lewis Diehl, of Louisville, and that he could not promise the Association that this gentleman would do his work any better than in the past, because he did not think he could do it any better. He did believe, however, that the new arrangement for the publication of a *Journal* would enable him to do his work easier, and he congratulated him upon that.

Mr. Payne introduced Mr. Diehl in his usual felicitous style, and Mr. Diehl thanked the members for the honor conferred upon him, assuring them that, as in the past, he would try to do his whole duty, and if he could improve upon his work in any way he would do so.

The Chair stated the new Chairman of the Council, Mr. J. H. Beal, was not present, and, therefore, could not be installed; nor was Mr. J. P. Remington, the second of the newly-elected members of the Council present. This left the Chair alone to represent that body. Mr. Payne, of the committee, thereupon proceeded to introduce Mr. Rusby to the Association, as a man upon whom the Association had conferred every honor it could confer.

Mr. Rusby spoke of the work of the Council. He said it had been suggested that the Council should not hold its sessions at the same time the Sections did, but he wanted to say that if that proposition carried the Association could not have its business properly attended to. The Council was a hard-working, deliberative body, and it had necessarily had to consume a great deal of time at this meeting to do the work it had found necessary to accomplish. He said he hoped the Association would remember these facts, if a motion to curtail the time of the Council was ever made.

The Chair called on Mr. Payne to introduce the Secretary-elect, Mr. Charles Caspari, Jr., of Baltimore, stating that this should have been done before, but by oversight it had been omitted.

Mr. Payne introduced Mr. Caspari as a faithful officer, who needed no introduction to the members, and Mr. Caspari expressed his deep appreciation of the continued confidence of the members, saying that he looked back with a great deal of pleasure over the past 16 years in which he had been called on to serve in the office of Secretary. He said the best thing he could say was to express the wish that the coming years would be as successful as the past. He also expressed the hope that the relations between himself and the new President might be as pleasant and as fruitful of good results as they had been in the past with his predecessors.

President-elect Eberle here took the Chair as the presiding officer of the Association.

Mr. Ford, of Denver said he wanted the distinction of first addressing the new President, and moved that a vote of thanks be extended the retiring President and the other retiring officers, whose services to the Association justly entitle them to such recognition.

This motion was seconded by Mr. Hallberg, and Mr. Roehrig moved that the Association take a rising vote. The Chair thereupon put the vote upon Mr. Ford's motion, and it carried by a unanimous rising vote.

The Chair asked if there was any other business, before the Association, and the Secretary stated that he knew of none.

Ex-president Rusby briefly expressed his thanks for the kind tribute just paid him, and said he felt that he might include in this expression of thanks those of the other retiring officers.

The Chair stated that if there was no other business to come before the Association, a motion to adjourn would be in order. He said he was sure the members would take away with them a happy recollection of their stay in the city of Richmond, and carry with them a sense of satisfaction at having done such exceedingly good work. He had watched the work of the Sections, and he did not remember to have seen closer attention given to the work of the Sections anywhere than at this meeting. As far as he knew the work had passed off well, and he hoped to the satisfaction of everybody.

Thereupon Mr. Hallberg, seconded by Mr. Hays, moved that the Association's Fifty-Eighth Annual Meeting adjourn *sine die*, and the motion prevailed.

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST (ONLY) SESSION—TUESDAY, MAY 3, 1910.

The Section on Commercial Interests convened at 3 o'clock, p. m., in the Auditorium of the Jefferson Hotel, and was called to order by Waldo M. Bowman, of Toledo, Ohio, Chairman.

The Chairman: Inasmuch as neither the Secretary of the Committee, nor any one of the three associates is here, I will ask Mr. W. W. Miller, of Richmond, to act as temporary Secretary; and I will call on Mr. Apple, of Philadelphia, to sit as an Associate on the Committee, if he will. I would like also for Mr. Apple to take the Chair, while the Chairman reads his address.

Mr. Apple being in the Chair, and Mr. Miller acting as Secretary of the meeting, Chairman Bowman here read the following:

THE CHAIRMAN'S ADDRESS.

It is a far cry from coast to coast, and a long journey from sunny Los Angeles to historic Richmond, yet the greeting of the pharmacist on the one coast differs not a great deal from that of his brother on the other, and the problems of the profession with the questions that ever arise are with us always. I do not think it is inopportune for me to again call your attention the fact that the Section on Commercial interests represents the actual moving power of this Association that it is this section that must, in the end, carry out the work as proposed by the other sections: For legislate as you will, and experiment as you will, the men who must bear the brunt after all, in the education of the public; in securing the co-operation of the physicians; in the support of the various activities of the government in its work for purer drugs, are the commercial men, who, looking after the working end are in touch with the consumer. As soon as we elevate the commercialism of pharmacy to its true level and find a means of holding it there, and not before, will the profession come to its own. You know how well and how often it has been proven that the college which places its graduates in a position to step into the current of every-day activities, is the one whose power is most felt; and the engineer with the keen insight into the working needs of his profession is the one who makes his name stand out, clear cut, and above the level of his associates. So it must be always and ever; the teacher works through his pupils, the school through its graduates, and the brunt of the labor falls on the man who serves his fellows in the

every-day work of life. We must elevate our commercial standing before we can improve our professional standing.

The last year has seen the growth of pernicious advertising of a certain class of preparations, to a point where the wonder is that the public will stand for the insult to its good judgment. In the East a new danger has shown forth in the growing strength of the "Chain Store" problem, and this has brought forth a suggested remedy that will, as far as the uplifting of pharmacy goes, surely breed a disease more pernicious than the one it seeks to cure, for in "Democratic America" (if you please), no combination exists for long with a clean "Bill of Health" where its base rests on the earning power of the dollar, and your syndicate working for the eradication of one evil will surely breed the germ of a pestilence far reaching and virulent.

As time goes on the question of *Labor*, threatening in all lines, becomes more and more a factor in commercial pharmacy, for, with but meagre attraction in the matter of wages, the fewer advantages in other ways, the long hours and few holidays, the number of competent men who take up the work becomes fewer and fewer in proportion to the demand. This condition the colleges can not remedy, the cure must come from the trade body. The increased cost and scarcity of a largely increasing number of our native drugs brings us face to face with a fact that we persistently ignore; that if we are to continue the use of our native drugs we can not much longer draw on lavish nature alone, but must aid and abet her in the conservation of her resources, and must take up the cultivation of a number of our native drugs for commercial purposes.

We must remember that this is not the work of a day nor a year, possibly the working out on a basis of commercial profit is not the work of a life-time, but looking forward into the future the need becomes very apparent, and I would suggest that this Section appoint a committee to look into the subject and gather such information as may be obtainable reporting same to the Association. This will open a most interesting field of work and the subject becomes so virile that it would be well worth the while of the Association to take some steps toward the giving-out of information in detail on the possibilities of the cultivation of certain native drug plants for commercial purposes. I am well aware that the Dept. of Agriculture is working along these lines, but there need be no conflict of interest. The so-called drug departments of the large stores in the cities are an eyesore to the pharmacist, they are used as an advertising medium for the stores rather than a source of income, their work is done by cheap labor, their whole tendency is toward predjudicing the public against the legitimate pharmacist. When we find these departments working with the active support of the wholesale drug trade we are forced to believe that the effort to interest the wholesaler in the work of this Association is a failure, and when we find these departments furnishing misbranded drugs and inferior articles we as an association should condemn them in no uncertain way. The increasing traffic in opiates and narcotics in spite of the efforts of the authorities to curb their sale, makes it obligatory on us to avoid even the appearance of evil, and to absolutely refuse to countenance the sale of such drugs except through the prescription department.

What are you doing through your State Associations toward the elimination of trade evils? What in your local societies for the purification of commercial pharmacy? What are you doing for yourself, Mr. Pharmacist? Pertinent questions, you say! Yes; they are pertinent questions, but they are dominant questions as well, and they are questions that you dare not ignore for long.

The medical profession, in a way, is seeing things in a clearer light, and is waiting your advances. The status of this Association is becoming clearer and its influence will continue to advance through the elevation of standards of purity. Even now the daily press and the magazines are beginning to heed the demand for the elimination of obnoxious advertising. Can you close your ears to the cry; your eyes to the light? Will you wait for an extraneous force to lift you from yourself? Do you stand like the

Norseman waiting for the "warning from the winds?" Why wait for "the voice of one long dead" to tell you of your loss? Why die awake? Don't do it! Stand up! To the possibilities of commercial pharmacy, to the justification of your own good name! And remember that "a good name is more to be desired than great riches," even in modern America with its greed for getting and its God in the almighty dollar.

THE CHAIRMAN *pro tem.*: Gentlemen, you have heard the address of the Chairman of this Section. What disposition shall be made of it?

MR. LOWE: I move that it be received and referred to the Publication Committee.

MR. HYNSON: It seems to me that an address like that, which shows so much thought, should receive a little more attention. I believe the Chairman has written it believing what he has said to be true, and would be glad to hear us discuss it a little, would you not?

THE CHAIRMAN *pro tem.*: The motion has been duly made and is now open for discussion, if any is desired.

MR. HYNSON: I simply want to say, from the experience I have had, and some little effort I have put forth, that I think it very unfair not to discuss a paper like that and discuss it fully, and I would suggest that the Chairman read again to the meeting such parts of his address as deal with what he feels to be the most important points, and let the Section take such action as it sees fit. I make the motion, that the Chairman be requested to read such parts as he deems most important, and that the meeting discuss these parts seriatim.

Motion duly seconded and carried.

MR. BOWMAN: The Chairman thanks you very much for the interest you have shown in his address. One thing is certain, that unless the American Pharmaceutical Association does interest the commercial men and the pharmacists to a much greater extent than it has succeeded in doing in the past, the good it is going to do will be limited on every hand. I think the Association, as a whole, recognizes that fact. I know that the commercial men who do take an interest in the work of the Association recognize that fact.

I will first take up this part of my address; I say:

"The last year has seen the growth of pernicious advertising of a certain class of preparations, to a point where the wonder is that the public will stand for the insult to its good judgment."

THE CHAIRMAN *pro tem.*: The question is, gentlemen, whether you will now care to discuss that particular matter before you hear a paper which I find, upon looking over the program, will be read before another section, and which I think just touches on this same subject.

MR. BOWMAN: There is a paper that touches this question, but inasmuch as this Section is only to present five original papers, and as the Section on Practical Pharmacy and Dispensing finds itself somewhat hampered in their two sessions, their Chairman and myself have come to an agreement by which we will give over the time allotted for our second session, to the Section on Practical Pharmacy and Dispensing, and combine our session tomorrow afternoon with that of their Section, so in all probability the paper in question will not be presented except by title.

THE CHAIRMAN *pro tem.*: That being the case, we will take this matter up and discuss it at this time, as it will unquestionably not come up for discussion at a later stage.

MR. BOWMAN: I might say that what seems to me to be the meanest and most insulting class of advertising, to the public, that has come about of late years, has been that which has appeared recently in the Ohio papers, and I presume in other papers, purporting to be answers by physicians to questions which have been mailed to them, and advertising from eight to ten remedies in the daily press. That, to me, is the absolute limit of that kind of advertising. It is an insult to the public.

MR. HYNSON: I would like to ask the Chairman if he has thought of any means for remedying the evil.

MR. BOWMAN: I must say I have not.

MR. BODEMANN: That question has come up in the Ohio Association, in a similar shape, and it was recommended by the Trade Interests Committee that a bill be prepared and introduced in the State legislature, requiring that all such stuff as that should be printed for what it is worth—have it marked as an “ad”, and not have it appear in the paper as an editorial opinion or as reading matter. A similar step has been taken by the Civic Federations in San Francisco, to require that any reading matter which is printed by a newspaper in return for money, gift or other compensation, shall be marked and branded as advertising. Therefore, I would move that the matter be referred to the Legislative Committee, with the recommendation of this Section that such a bill be prepared for introduction in the various State legislatures, requiring the branding of such advertisements as “ads”, and prohibiting their publication as reading notices.

THE CHAIRMAN *pro tem.*: You stated “recommend,” did you not, to the Legislative Committee?

MR. BODEMANN: Yes, sir.

MR. LOWE: I think that to a certain extent we have control of this matter in our own hands. Some of the pharmacists are informing their customers that these are not *bona fide* reading notices, but are advertisements in disguise—not what they appear to be on the surface, but shrewd catch-pennies. In my neighborhood we have so thrown the weight of our influence against this class of advertising that we are not suffering from so great an invasion of it now as we otherwise would. A lady came into our establishment the other day and asked for a certain article, which she said she had seen highly recommended in the papers. I knew her very well, and commenced to laugh, and told her that what she saw was nothing but an advertisement, and that I could sell her any one of half a dozen other different things which would do her just as much good, and at a very much lower rate. I think if we use the weight of our influence we can in a large measure counteract the effect of this particular class of advertising.

MR. DITTMAYER, of West Virginia: I agree with what Mr. Lowe says. One way I do; I keep the circulars sent out by these houses—for instance, one in Chicago, that makes about six preparations—in which circulars they name the prices to the druggists, and they also make this remark: “The peculiar advertising we are doing will catch the people.” I just keep that circular, and whenever any one comes in and asks about these remedies I show him the circular and tell him it is a “fake,” and in a majority of cases the customer will take my word, and leave it alone.

MR. E. H. LADISH: That is all very well, but by individual effort you will be as far from obtaining results as you were two or three years ago when brother Hynson drew

up a fine resolution and referred it to the Publication Committee, and there it died. What you want is action. The mere telling of what an individual does in one section of the country, and what is done by another individual two thousand miles away, amounts to nothing. Now if you refer this to the Section on National Education and Legislation, let them see to it that some one gets busy in the various states, and does something. For two or three years we have been talking about these things but haven't done anything, and the thing has become so overwhelming that everybody is kicking. They dismissed the subject two or three years ago very lightly—didn't think much about it. Action is what you want.

MR. HYNSON: I would like to ask if that motion was to send to the Section, or to the Legislative Committee?

MR. BODEMANN: I said to the Legislative Committee. I want to emphasize the truth of what Mr. Ladish said. It reminds me of what my friend Bismarck once said: "You will never make Germany united by resolutions and whereas, because there are too many other 'asses'" (Laughter). "It will take blood and iron." It will take a law, and a strong one, to deal with these people, and private individual effort will not do it.

THE CHAIRMAN *pro tem.*: Has anyone else anything to say? While sitting here and listening to this discussion, the thought flashed through my mind—it never having occurred to me before—that in nearly all these preparations there is a large percentage of whiskey, brandy or alcohol, and it might not be a bad idea to have the attention of the National Women's Christian Temperance Union called to that fact; they would probably take action in regard to the matter and might be of assistance to us. I throw this suggestion out, as it just occurred to me. We will first now take a vote on the motion of Mr. Bodemann; that is, to send it to the Legislative Committee.

MR. EMANUEL: Would it not be well to have someone draw up a bill and have it presented to the Legislative Committee, and have that Committee send a copy of it to each branch in the country, with the recommendation that they have it introduced in their State Legislatures?

THE CHAIRMAN *pro tem.*: I don't think this Section has that power; we must first present it to the general body for action.

Motion was here voted on and carried.

MR. HYNSON: I move that we request the General Association to instruct the General Secretary to communicate our views in regard to this matter to the National Women's Christian Temperance Union.

MR. BODEMANN: I second the motion.

Carried.

THE CHAIRMAN *pro tem.*: We are now ready to proceed to the next portion of the address.

MR. BOWMAN: If I had known the attitude of the Association on this question, at the time I incorporated this in my address, I would have left it out; but as I have given much thought to the matter, and have put it in my address, I will read it to you:

"In the East, a new danger has shown forth in the growing strength of the 'chain store' problem, and this has brought forth a suggested remedy that will, as far as the uplifting of pharmacy goes, surely breed a disease more pernicious than the one it seeks

to cure, for in 'Democratic America' (if you please), no combination exists for long with a clean 'Bill of Health,' where its base rests on the earning power of the dollar, and your syndicate (the American Druggists' Syndicate) working for the eradication of one evil, will surely breed the germ of a pestilence far-reaching and virulent."

MR. HYNSON: I move that the Chairman be empowered to appoint a committee of three to confer with the Committee on President's Address on this same subject.

MR. CHARLES REHFUSS: Would it not be well to get the views of the members of this Association on this particular subject? The motion is to appoint a committee of three to confer with the Committee on President's Address; what is that committee to do—simply to voice their views in the matter or the views of the members assembled here? I think it should be discussed here and the views of the members ascertained, and then send your committee to confer with the Committee on President's Address. If you appoint the committee without first ascertaining the views of the members here, how do we know what they are going to do? Their views may differ entirely with mine and may go there and squelch this whole business—which I hope they will not do. I offer as a substitute motion that we concur in the views of the Chairman of this Section, and that a committee be appointed to confer with the Committee on President's Address on the subject.

MR. HYNSON: I concur in that.

THE CHAIRMAN *pro tem.*: Gentlemen, the matter is now open for discussion.

MR. W. C. ALPERS: I would like Mr. Bowman to explain why he wrote that—or, in other words, what are the dangers he speaks of—of what do they consist, and why he wants the Association to pass such a resolution; why the necessity exists for it to do so, and particularly in what respect the syndicate he refers to, the A. D. S.—American Druggists' Syndicate—is a danger to pharmacy. I, personally, consider it a blessing, and if I am wrong of course I would like to be set straight about it, and so I would like the gentleman to give us his full views, and his reasons for them—not simply make a vague statement, but his reasons in detail, and proofs, why this syndicate is a danger to American pharmacy.

MR. BOWMAN: First let me explain that as Chairman of the Section I did not ask the Section to endorse my view on the subject. I presented it to you for discussion, as the thought of the Chairman's address. If the Section as a whole sees fit to endorse what I have said, I shall feel greatly honored. The reason I wrote that is simply this: My understanding of the thing is that in the East—and not only in the East but all over the country—a darkening cloud is showing forth in the growth of the so-called "chain stores," of a corporation taking over a number of stores and running them, as a whole, with incompetent help, and as a rule paying little attention to scientific pharmacy, foisting upon the people the cheapest materials they can get—not always, understand, but I say in some cases which have come under my observation, at least—to the detriment of the individual pharmacist who strives to serve the people in the best way he can. Now, I am not what you would call an "eastern man," and possibly don't look at these things as you gentlemen from Greater New York look at them, but having examined a little, at least, into the plan of the American Druggists' Syndicate, of creating a chain of stores working along the same line, I say simply this, that no combination exists for long with a clean "bill of health," where its base rests on the earning power of the dollar. That is to say, that there is no combination that comes together for a semi-philanthropic purpose—for the purpose of eradicating one evil—into which in a short time disease does not creep; and the first thing you know, instead of doing good this combination is a source of evil.

MR. LADISH: Is there a motion before the house? If there is, what is it? I do not recall, exactly.

THE CHAIRMAN *pro tem.*: The motion is in reference to appointing a committee of three to confer with the Committee on President's Address.

MR. LADISH: I don't think this Section ought to appoint a committee of three. I think the committee that has the President's Address in charge, ought to have all this information, however, and it ought to be referred to them. This question is too big to have only a portion of this convention discuss it, and if you do discuss it now you are going to tire some of these people who have settled opinions on it. I therefore, offer as a substitute, if it is in order, that this section of the paper be referred to the Committee on President's Address.

THE CHAIRMAN *pro tem.*: Does any one second that?

MR. W. C. ANDERSON, Brooklyn: I would like to rise to second that motion, and in doing so I will state that I believe the Chairman, in his address on this subject (while I did not hear all of it, as I was compelled to be away attending a committee meeting) has given the members an entirely different idea of the A. D. S. workings—different from any that organization has ever undertaken, or ever had any idea of undertaking. In the first place, the A. D. S. has never attempted to establish a chain of stores. The proposition to go into such a business was practically voted down at a convention of the stockholders, and consequently, why the A. D. S. should be accused of going into the chain-store business, I can not understand. I have read the reports in most of the pharmaceutical journals in reference to the A. D. S. meetings and the work of the organization, and I have never yet seen one report which placed the A. D. S. in the position of starting one chain of stores. The true position of the A. D. S. in reference to this matter is that it places at the disposal of its members who are threatened by the establishment of chains of stores by the large corporations, the capital of that organization—the goods of that organization—in order that its members may meet the competition. One of the principles of the A. D. S. from the very beginning was to protect the individual retail druggist, to enable him to continue in business on his own account—to keep him from being driven out of the business, as we may say, to give him a living profit on the goods that he sells; and the work that the A. D. S. is doing to-day in reference to combating the chain-store evil, is to select a position where a member is threatened by an opposition store, and back that member in every way possible to keep him in business. I might give an illustration: I have a store in Brooklyn, and am a member of the A. D. S. Suppose the Hegeman Corporation or the Riker Corporation should come to me and offer to purchase my store, and I refused to sell, and they should tell me (as they have told other druggists), "We will establish a store across the street from you," or on the opposite corner, "and we will simply drive you out of business, as you can not meet our competition." If that condition should exist to-day, I, being a member of the A. D. S., the A. D. S. would put the force of that organization back of me; would give me the benefit of its great buying power, would give me the bottom prices on proprietary remedies, on toilet articles, and so forth, and would put into my store, if I should desire it, a line of goods such as the large corporation handled. If I wanted it, they would supply me with the capital to refurnish my store with new fixtures, so as to make it as attractive as the store across the street that was trying to ruin me. In other words, I would have the full force of that organization back of me, in order to enable me to meet the competition of the chain store that was trying to force me out of existence. That is the true situation as to the A. D. S., and the one thing it has ever attempted to do. We have one store at the

present time, in New York, which was threatened by the chain store—a new store established, with magnificent fixtures, and selling at the very lowest prices, cut rates on everything—and that store is to-day being backed by the A. D. S. For two months after the opposition store was started it looked as if the member would have to go out of existence, but just as soon as the force of the A. D. S. was put back of him, and he was given the advantages of its buying power, he was able to reduce the prices on his goods to the same as charged by the corporation store; the business of this member has gradually increased, and to-day his store stands as one of the first instances of the possibility of a retail druggist being allowed to remain in business and keep his identity, in opposition to the chain store. Now gentlemen, could that man have met the opposition of the corporation stores, and remained in existence if it had not been for the A. D. S. being back of him? I say no; it has been tried time and time again, and the result has been a failure, but in this instance, as we have proven, he has been enabled to keep in business, through the support given to him by the A. D. S., and that is one object of that corporation to-day, with reference to the chain-store evil, to keep the individual druggist running his own store, and prevent him from being driven to the wall by the competition of the large corporation stores. Therefore, I say that before anything is adopted in reference to this matter, there should be a correction made in the information given to this body; it is not fair to the organization, it is not fair to the retail druggist, that a misrepresentation should be made. I do not mean to say that the Chairman has made a misrepresentation intentionally; he has perhaps had some information upon which he has based his remarks, but it was not good information. I do not want to go into the details of the injury done by the chain store; that is too well-known to all of you, and we know that the danger is spreading, not only in Greater New York but throughout the whole country; consequently, I might say to you, as our President said this morning—and he no doubt has given the question very serious thought, or he would not have brought up the matter before the convention—in what other way can we protect the retailer against these chain stores that are driving him out of business? Is there any other proposition? If there is, let us have it. If it is better than the A. D. S., for gracious sake let the retailer have it; we want the retailer to continue in business, and not become a manager or clerk for the Hegeman or Riker Corporation, or the A. D. S.—if it could be turned into a thing of that kind. We are after the elevation of the retail druggist, and if we have no better means of protecting him let us take advantage of what we have at the present time, and not attempt to condemn it.

THE CHAIRMAN *pro tem.*: Before we enter into any further discussion of this motion, I wish to call attention to a portion of the address which has been lost sight of, and which is the vital part of all this. The Chairman states: "In the East, a new danger has shown forth in the growing strength of the chain-store problem, and this has brought forth a suggested remedy that will, as far as the uplifting of Pharmacy goes", &c. That is the principle he alludes to, "as far as the uplifting of Pharmacy goes". He says this has this tendency. Now in all this discussion there has not been a word said contrary to this part here; that is the part he wishes you to concur in; that is the milk in the cocoanut.

MR. BOWMAN: The Chairman tried to make that sentence the basis of the whole thing.

MR. ANDERSON: I would like to ask what the Chairman means by the "uplifting of Pharmacy". I do not believe there are any pharmacists here not in favor of that. If we are not here for that, we would not be members of the American Pharmaceutical Association; but while we are all in favor of the "uplifting of Pharmacy," we all realize it is impossible for us to keep it uplifted unless we have something in our pockets to keep us going.

MR. BOWMAN: I have never been able to see how pharmacy could be uplifted by meeting clean-cut, close competition on proprietary remedies and toilet articles. That is good commercialism, I admit, but, gentlemen, is it true pharmacy?

MR. ALPERS: In reference to this last remark, that pharmacy cannot be uplifted by meeting keen competition from which we cannot escape, then the only thing that can be done by one of these unhappy individuals who has one of the big stores established in his neighborhood, is to go to the poor house and uplift pharmacy in that way. Is that his opinion? What does he propose to do if one of these chain stores should be located across the street from him? Will he tell us how he is going to uplift pharmacy under those conditions—except to meet the competition and show these large stores that they are not almighty, and that there is a combination among the druggists that can fight them; and if the druggists act harmoniously and through the agency of their organization help the unhappy member who is in danger of being crushed out by the competition of the chain stores, will not the establishing of these chain stores soon be stopped? No matter whether we uplift pharmacy in that one instance, or not, we don't pull it down; we help a member in distress; it is the one thing in that case we can do—help him by every means we have to help him, and then we can speak of the uplifting question, but as long as we sit idly by and allow these large corporations to crush out the individual retailers, one after the other, where does the "uplifting of pharmacy" come in? It is a phrase used here to attack a beneficial organization; it is a vague phrase that in this instance means absolutely nothing. We have the means to fight these large corporations when they try to crush us out, and let us take advantage of it; or if you have any better plan, let us know it. Tell us what you would do in such a case, if one of these large corporation stores was to be located along side of yours, or across the street from you! Where would you go for assistance—and let the others come and tell us.

MR. PRITCHARD: What we want to arrive at is, what, in the Chairman's opinion, is the best plan, or what does he propose, to prevent this outside power from causing depression in pharmacy? Now the only thing offered so far has been a plan by which a certain fund shall be created, which a pharmacist who desires to remain a pharmacist, can depend upon for aid in his fight to preserve his business which he has been able to build up only after years of struggle. There has been no plan proposed that would prevent such a man from being crushed out, other than what has been explained in our hearing by Dr. Anderson. I am in a position that I am thoroughly independent of every retailer, wholesaler, buying club, or anything else. After having conducted my own drugstore for twenty-eight years I am now outside of the retail drug business and am looked upon as a consulting engineer. My opinion is that under present conditions a man who has a good drugstore, established in a good location, and is threatened by the coming of a chain store into the same neighborhood with being crushed out of business, has no place in God's world to go to for help. Now the paper read this afternoon by the Chairman of this Section is an illustration of the danger of a little learning. I say this without meaning to be at all offensive. The Chairman has a little learning in regard to chain stores, and a very much smaller amount of learning in regard to the proposed efforts adopted by the A. D. S. Now the A. D. S. method is to put a fund where it can be had for the use of the retail druggist who is threatened with being crushed out. That don't mean, necessarily, that another store must be established to crush out the proposed new store; it only means that the fellow who proposes to invade a certain territory to crush out the retailer who already occupies it will not do so if he knows there is an immense fund which can be drawn upon for assistance, by the victim who has been spotted by the chain stores. If this Association has something better to offer

than what the A. D. S. offers, let us have it; but unless you have something practicable to suggest, don't come here with papers telling us to drive that thing away, which is the only thing we now have to assist us in our fight against this competition, but help us to build it up.

MR. REHFUSS: Mr. Chairman, I have listened with a great deal of interest to what Dr. Anderson has said. I think it is the first time I have heard a clean-cut statement of what the A. D. S. proposed to do with regard to the chain-store proposition. I think the Chairman of this Section, like myself, has probably been led away by the newspaper accounts of what the American Druggists' Syndicate would do with regard to chain stores. I know my impression has been all along that the A. D. S. proposed to start stores where they found retailers who were not in sympathy with their movement. That has been the impression that has been gained by a great many pharmacists throughout this country; it has been the impression I have always had. I have nothing against the A. D. S. and never have had; no one has ever heard me say one word in criticism of it; they have their mission to fill and are justified in their existence, and no doubt they are a great benefit to retail druggists. To me they have been of no use; but I say I am very glad Dr. Anderson has made this clean-cut statement of just what their position is with regard to chain stores. It is the first I have heard of it, and I know there are others here who have not gotten the information in the same light Dr. Anderson has given it to us.

THE CHAIRMAN *pro tem.*: If I might interrogate the Chairman, I would like to know—you do not object to certain activities of the A. D. S.; it is only along the line of interfering with the uplifting of pharmacy.

MR. BOWMAN: That is the only thing I object to, and the only reason I touched upon it in my address was that I hoped to bring out information such as has been brought out. I hoped to find out what the attitude of the members of this Association was with regard to work of that kind. I hardly hoped to have as concise a statement of the intentions of the A. D. S. as we have had, but my object was to bring out information on the subject which the Association would not have had otherwise, and I feel more than repaid. I do not object at all to the work of the A. D. S. along certain lines. I still think that as far as the uplifting of pharmacy goes, the fighting of the chain stores by competition, even as the gentleman says the A. D. S. proposes, has not helped it. That is simply my individual opinion. If you do not agree with me, I cannot help it. I did not expect you would. I am glad the discussion has brought out the points it has, and I am glad we know the attitude of the A. D. S. in regard to the matter.

MR. C. M. FORD: I would like to suggest that we find some way of stopping this useless talk. There was a committee appointed by the general session to work on this same thing, and I don't see why this body should take up for consideration the affairs of an organization like the A. D. S. any more than they should the affairs of any other organization. As to the quality of their goods, you might get information by going to individuals here, but no one is going to rise here and tell you, even if you ask. Dr. Anderson has given us a very pretty figure of the A. D. S. and what it has promised to do, and he has said something of what it has done. His picture is right in every particular, except that it is not true, and as far as the A. D. S. saying they are not in the chain-store business, they have made the threat. You can go around and ask individuals here whether their word is good. I am a member of the A. D. S. and one of the oldest; I got my stock for nothing, or nearly nothing, and am willing to sell it at the market price (laughter). If he thinks the quality of their goods is equal to some other houses, then let him put them on his shelves. We do not think so; it is doing us a lot

of harm. But I do not think it is the business of this Association to take up the quality of their goods, and I am sorry the Chairman of this Section has taken up the matter. I should as soon think of attacking Parke, Davis & Co. or some other concern, and bringing them before this body for trial. They are not on trial here, and you would not think of bringing them here and putting them on trial before this Association, for any such thing.

MR. ANDERSON: I do not think the remarks of the gentleman call for much answer—except one assertion as to what I had to say as to the plans of the A. D. S. being not true. The gentleman is entirely in error in making that statement, and I think he will be glad to retract it.

MR. FORD: No; I said the picture you drew of what they would do for a man in Brooklyn—and Brooklyn is just a small part of this great country (in fact I have not seen it but once in a lifetime; at the distance we are we can not take much interest in the affairs of a little city like Brooklyn—I say the picture you drew is not true because it is not real, and I do not believe it will ever be realized by the A. D. S. under its present organization.

MR. ANDERSON: Of course we can not say what the future will bring forth. I explained that the A. D. S. was trying to do this thing, and so far as undertaken it was successful. The gentleman says he don't want to put any concern on trial here as to its products; at the same time he attempts to condemn the A. D. S. products.

The CHAIRMAN *pro tem.*: Will Mr. Ladish please repeat his motion?

MR. LADISH: My motion is that this portion of the Chairman's address be referred to the Committee on President's Address, for their information.

MR. PRITCHARD: I move you that this paper be referred to the Publication Committee, and in doing that I concur in the views of the gentleman from Colorado when he said that this Association has absolutely nothing to do with the A. D. S. If the A. D. S. is in position to help the retail druggists, I think it will make it known to them, and just why the American Pharmaceutical Association should take up the work of the A. D. S., I cannot conceive. The A. D. S. is a private corporation, and, as I said awhile ago, it has the right to exist, and I have no objection to it; but I do object to this Association, or any other Association, taking up the work of the A. D. S. I think this paper should be referred to the Committee on Publication, and I make that as a substitute motion.

MR. YEOMANS: I would like to move, as a substitute for the substitute, that a transcript of the shorthand report of these proceedings be also referred with this address, which is to be referred to the Publication Committee, in order to correct some of the mis-statements that are made in this address.

MR. KILER: I second the motion.

Carried.

THE CHAIRMAN *pro tem.*: We are now ready to take up the next section of the address.

MR. BOWMAN: The next thing I spoke of was the question of Labor. That was simply a general statement. I say; then:

"The increased cost and scarcity of a largely increasing number of our native drugs brings us face to face with a fact that we persistently ignore; that if we are to continue the use of our native drugs we can not much longer draw on lavish Nature alone, but

must aid and abet her in the conservation of her resources, and must take up the cultivation of a number of our native drugs for commercial purposes. We must remember that this is not the work of a day, nor a year, possibly the working-out on a basis of commercial profit is not the work of a lifetime, but looking forward into the future the need becomes more apparent, and I would suggest that this section appoint a committee to look into the subject and gather such information as may be obtainable, reporting same to the Association. This will open up a most interesting field of work, and the subject becomes so virile that it would be well worth the while of the Association to take some steps toward the giving-out of information in detail on the possibilities of the cultivation of certain native drug plants for commercial purposes. I am well aware that the Department of Agriculture is working along these lines, but there need be no conflict of interest."

My object in saying that was simply this: I think you will all agree with me that we, as retail pharmacists, at least, do not fully appreciate and co-operate with the Department of Agriculture in its plant-investigation work. We, as users of certain native drugs, have seen the price go up and go up, and go up, until it became prohibitive. I think the manufacturer will agree with me that the difficulty in obtaining supplies of first quality domestic drugs is becoming greater and greater; and it simply occurred to me that if this Association, through a committee, should make some effort to gather all the data it possibly could on the possibility of plant cultivation, and that the Association should take some means of disseminating this to the general public, that it might in the end, possibly in one or two decades, work out to the commercial advantage of the manufacturer, and the retailer as well.

MR. C. B. LOWE: I think if the Chairman had looked into this matter more thoroughly, he would have found that the Government is doing a great deal at this time. They are cultivating a number of different seeds. Of course we know ginseng is being cultivated quite extensively now, and it is becoming a matter of profit to those who sell the seeds, at the prices at which they sell them, and I think possibly some of the cultivators of this root make considerable money. We could stand with complacency the extinction of ginseng, because it has no place in American pharmacy. On the other hand, hydrastis is an important product, and I understand the Government is devoting its energies toward the propagation of this plant, and it is possible that we will in a short time be growing it in this country.

MR. BOWMAN: The only object I had was to stimulate interest in the Association in this work.

MR. REHFUSS: I think the point of the Chairman is well taken. As Professor Lowe pointed out, the Government is doing extensive work along this line now, and is trying to get all the literature on the subject it can. I, myself, did some work in this line some years ago, when I was occupied by botany more than I am now. I received a letter from the Government asking me to send in all the papers I had written on this subject; and I know another man—Professor Lloyd—who has worked extensively in this direction. It is a subject that is well worth considering, and I believe the endorsement of the Association of the work of the Government can certainly do no harm. At this time a great many medicinal plants are being cultivated, or experimented with. They are trying to cultivate senna in California; and as has been pointed out, it would be well to cultivate hydrastis. I believe the time will come when nearly every plant of the pharmaceutical field will be grown in this country. A company has been formed in New York for cultivating the camphor tree in America, and they expect in a few years to have native camphor in the market. I make the motion that this part of the Chairman's address be endorsed.

MR. LOWE: Before action is taken, I would like Mr. Kebler to have ten or fifteen minutes in which to tell us what the government is doing along this line. I think it would be very interesting information to the Section to hear it.

THE CHAIRMAN *pro tem.*: I am sure we will all be glad to hear from Mr. Kebler.

MR. KEBLER: Mr. Chairman, while I know of the work being done in the Department of Agriculture, and am quite well versed in its various details, it comes to me second-hand. Dr. True, of the Bureau of Plant Industry, has charge of that work. They have experimented to a large extent, by the way of growing poppy, for the production of opium in the United States, and while they have been successful in producing opium which assayed fairly well, Mr. Richtmann knows more about that than I do, because he had that particular line under consideration when he was in Washington. They even produce morphine by treating the crushed plant itself. I was talking to the Secretary just the other day, and he referred to that feature. The only trouble appears to be to get the labor to produce the commodity. The capsules are simply gathered by a machine, or otherwise, and crushed, and the morphine removed in that manner, so as to eliminate going through the process of producing the opium itself. It is well known that there is so much more morphine used than opium, unfortunately, that that is a very important feature. Then they have grown large quantities of digitalis, and by the way, I am of the opinion that by proper investigation you will find that this country produces all the digitalis we want.

Last summer, when I was passing through the western portion of Oregon, I saw plants six, eight and ten feet high, with the nicest kind of leaves you could possibly imagine. We looked the situation over, and believe from the information we gathered there, that there is plenty of digitalis grown in the United States wild, to supply almost the entire demands of this country. I want to qualify this statement simply by saying that so far as I know, the article has not been tested with reference to its physiological activity, but Professor Hale, of Cincinnati, thinks that it is as active as that imported; consequently, I see no reason why the article grown in Oregon should not be as valuable as the article imported.

They have also grown considerable quantities of henbane leaves. Stramonium we need not speak of, as that is so common you can find it on every field of refuse.

MR. LOWE: How about hydrastis?

MR. KEBLER: The Department has done some work on hydrastis, but the work of Lloyd, so far as the records go in this country, surpasses that of any one else. I have never been out to his farm where he grows hydrastis, but he tells me that he has any quantity of hydrastis for immediate use for the United States. He does not have to rely on the market, and he has a very simple method of propagation. The growing of medicinal plants in the United States appears to depend on this one point, namely, obtaining labor at a reasonable price. First, labor at a reasonable price, and second, obtaining a price per acre of land cultivated equal to that of any other commodity grown. For example, if a farmer can grow 40 bushels of wheat to the acre, and get \$40 for it, deriving a certain profit, he expects that land to produce as much profit, with the same amount of labor, planted in some other commodity; and those are the two propositions we must overcome in the United States before drugs can be successfully grown, namely, cheap labor, and the possibility of producing for the owner of the land equally as great a return as he can obtain by growing any other regular farm commodity.

THE CHAIRMAN *pro tem.*: We are now ready to vote on the motion. Do we all understand the motion? Will the gentleman offering the motion kindly repeat it?

MR. REHFUSS: I made a motion that this part of the Chairman's address be endorsed by this Section.

The motion was then put and carried.

MR. BOWMAN: The balance of the address being of no special interest, we will dispense with the further consideration of it and take up the next number on the program.

(Mr. Bowman here resumed the Chair.)

THE CHAIRMAN: The first paper is entitled "The Chemical Laboratory as a Side Line," by the Secretary, George H. P. Lichthardt, of Sacramento. Inasmuch as Mr. Lichthardt is not here, and the paper is short, I will ask Mr. Seltzer, of Detroit, to read it.

THE CHEMICAL LABORATORY AS A SIDE-LINE.

BY G. P. LICHTHARDT, SACRAMENTO, CAL.

Often our attention has been directed to the various side-lines sold by the druggist for the purpose of adding to the small sum returned by his profession as a recompense for the sixteen hours of daily toil that seems to be necessary to conduct the usual bureau of public comfort known as a drug-store. We have had about everything from crockery and wall paper to shoe-polish and auto supplies; and, in fact, a writer in a paper some time since stated that, to be a successful druggist, one must be prepared to furnish everything likely to be asked for, and that while the prescription department was important, it was by no means the greater part of the drug business.

Now friends, I have a side-line that has paid well and has given good return for the investment. Some thirteen years ago when our present store was opened I made up my mind that by establishing an analytical laboratory a good source of revenue could be added; I went to the various physicians with whom I had an acquaintance and stated just what was proposed to be done. They were told that a laboratory for chemical and bacteriological work would be at their service and that I wanted the sputum work and urine-analysis, but alas, it must be said that the outlook was very poor for it was about five years before the first paying job was presented although plenty of charity work was done; but by keeping up with the advance of chemistry the physicians soon came to understand that here was a place where information on most any chemical subject could be obtained. To-day we have about \$2000 invested in this laboratory and the money is well invested.

The general public is responsible for the fact that medical men hold themselves superior to the pharmacist in knowledge pertaining to chemistry and allied sciences; for they side in with the physicians on all questions involving these subjects, not taking in consideration the fact that most medical men know little or nothing of these subjects. In building up a laboratory practice the pharmacist must overcome this prejudice

against him and his work. I remember during a controversy regarding a water-supply several years ago, when some of the doctors advocated the use of a certain well, I saw a chance and went into the fray with the result that one physician, an old school-mate of mine, came and said that it was ridiculous for me to make statements on such a subject as I had not graduated from a medical college and therefore knew nothing about the sciences. A few months afterward this same dear doctor rushed into my place and said, "Can you apply a test for strychnine immediately"? He was told that I certainly could and a box of powders was produced which upon examination proved to contain the poisonous alkaloid of nux vomica; these powders had been dispensed for calomel triturations. This physician now respects the attainments of at least one pill-roller.

Our work has made us known not only to the medical profession but to the laity as well, having proven to be the best advertising medium we can get. Interest has been taken in every municipal improvement in city, county, and state government and having done more or less chemical work for these branches of government the newspapers have brought the name of Lichthardt before the public many times.

In March of this year a bond election was held in Sacramento for the purpose of erecting a public filtration plant. This gave a great opportunity as the papers published many articles written by myself, and one gave me a half page with headlines in large type "Lichthardt Says"; I also gave lectures on filtration and performed experiments in all of the public schools.

This question of side-lines, I think, has been solved satisfactorily in my case; but as has been said before it is a case of keeping everlastingly at it, and such work cannot be built up in a day.

The paper being read, it was, on motion, duly seconded, referred to the Publication Committee.

THE CHAIRMAN: We will next listen to a paper on "The Telephone Question," by Wilhelm Bodemann, of Chicago.

Mr. Bodeman here read his paper.

THE TELEPHONE QUESTION.

BY WILHELM BODEMANN.

Why is it that after the retail druggists in our larger cities have demonstrated by years of experience that the telephone in their stores can be made a splendid money maker, turning expense into revenue and giving them a first-class service, that in hundreds of other cities the druggists do not fall in line and emancipate themselves from the old free lunch nuisance telephone? The success of this movement has been so thoroughly demonstrated it would seem as if every druggist in the United States tomorrow would want to get into the band wagon and make a profit instead of a loss

out of his telephone. They are doing this slowly, to be sure, but after all these years of experience it would seem as if all should join.

Wherever the slot telephone has been introduced it has been found a winner from the start. Pessimists in large cities, generally the larger downtown stores, have at first feared that the slot pay telephone would prove injurious. The reverse has been the result in most cities, where these large downtown stores overcame their fears we can show you by figures that some of them pay a good part of their high rent by these pay telephones, and, as you all know, figures don't lie. By figures I can demonstrate that these large downtown stores have their own telephone free of expense, always open for inpouring orders, and clear a heavy share of the rent to boot. It does not require legal evidence to prove the fact that a man who has business to transact over the telephone values his time more than the expenditure of a nickel, hence talks condensed—shorthand as it were—while a free-luncher who telephones because the telephone is free, has time to burn, and knocks your own telephone out of business for business. The telephone companies are willing to establish pay telephones, the public is willing to pay for telephone service, why should the druggists stand back and let their chance to reap a harvest go to waste by refusing to introduce pay telephones? The great N. A. R. D. has made the introduction of pay telephones an issue, and this issue has brought results in the increased membership in every city where pay telephones have been established. I assert that the great A. Ph. A., standing as it does for all that is "Good and Pure" and in the line of uplift movements, should add the introduction of pay telephones to its strongest arms of activities. I use the phrase "Good and Pure" advisedly. I need not go into a long argument, because I dislike long-winded harangues, to prove to you, my brethren of the A. Ph. A., that I deprecate profanity, and on that account I advocate slot telephones, simply for their purifying remedial properties. With the old-line telephones I have heard more sulphurous invocations in pharmacies than can ever be expected in Dante's Inferno. Introduce fireproof, soundproof booths with the pay telephones, and the service becomes at once so admirable that the drug-store atmosphere changes to the environments of one of the Moody and Sankey revival meetings. I would therefore strongly advise the establishment of a Standing Committee of your Section, devoting its energies to the promotion of pay telephones.

I wish I could have been briefer, but my time is limited, and I recommend a discussion of this subject to your good graces.

I attach as a sample of my method of going at it—a letter addressed to Kansas City Druggists which I wish to make a part of this paper.

To the Kansas City Druggists :

If I were in the place of the Kansas City druggists I would do one of three things :

First. I would induce the Home Telephone Company to install slot phones, for reasons explained in this letter.

Second. If the Home Company refused to install slot phones, put the Home phone in a part of the room where it is not accessible to the public.

Third. Should the Home Telephone Company decline to remove the phones to back room, or refuse to install slot phones, do away with the unprofitable phone altogether for following reasons:

Nothing better illustrates the fact that experience is the greatest teacher than the evolution of the drug store telephone. There are few cities of any size in which the druggist has not been able to find out that if he has a slot machine telephone he gets good service for himself and for the public, and that he as well puts into his pocket a substantial return of the service rendered. The old practice was bad service for everybody and an annual rental paid out by the druggist. In some few places this practice still remains that the telephone of one company has a slot machine and the telephone of the other company is free, *i. e.*, it is free to the public but not free to the druggist, because he pays for it.

Some who have not investigated the practice elsewhere seem to think they would lose business if they do away with this free telephone. It has been demonstrated again and again that this is not the case. The drug store is the natural public telephone station and the public is willing to pay for good accommodations and good service. No one ever thanked us for the privilege of standing in line behind our hard-worked telephones while the free-lunch fiends gradually got out of the way one by one. In fact, all we got was the reverse of thanks.

Druggists who have two telephones and are operating both with slot machines are not only giving the public better accommodation, for which they get thanks and pay, but they are getting good telephone service for themselves and proper pay for the space afforded and services rendered. This is no experiment, but the experience of years has shown that there is every reason for emancipating the drug store telephone from the free-lunch rut. There is not one good reason for going ahead in the old way. It is in the hands of the druggists to accomplish this themselves.

The Telephone Committee of the N. A. R. D. has been preaching this for years. One by one the big cities have fallen in line and telephones represent a big profit to the drug interests instead of a big expense. Hundreds of delegates to our conventions have testified to this. Thousands in the trade all over the country are daily testifying to it by their use. Generally our trade is not backward in protecting itself against loss or imposition, especially where no good comes from it. Why there can be any substantial number who prefer to pay out their good money for telephone service, which they themselves make bad by attempting to give it away, is one of the things which seems past finding out.

Yours for profit and comfort,

W. BODEMANN,
Chairman N. A. R. D. Telephone Committee.

THE CHAIRMAN: The paper is before you. Is there any discussion?

MR. LOWE: I think it might be interesting to have Mr. Rehfuss, of the P. A. R. D. Committee, tell us about that.

MR. REHFUSS: The telephone question is one that the P. A. R. D. has been interested in for years. I think we were one of the first Associations, next to Chicago, to take up the telephone question with the telephone companies. Prior to that time we were only receiving a commission of 10 per cent., but after some little agitation on the part of the members of the Association, and work with the telephone company, we succeeded in getting that commission up to a point where it now pays $33\frac{1}{3}$ per cent., after a certain guarantee has been made to the telephone company. In other words, we have a guar-

antee of \$4.50 a month—15 cents a day—and a telephone doing \$15.00 worth of business a month or less gets 25 per cent. commission; over \$15.00, 33 $\frac{1}{3}$ per cent. commission; and I want to tell you that the telephone business is a source of a good deal of profit to the druggists of Philadelphia. We find that very few go under \$15.00 a month, and a great many run up as high as \$60.00, \$75.00 and \$100.00, even in the smaller stores. It seems that the smaller stores get a great deal of business from their neighborhoods, and it is a source of much profit to the druggists. Another thing: we were annoyed for years by people from distant sections of the city calling us up and asking us to deliver messages in the neighborhood, so the druggists got together and agreed to charge for delivering such messages, so that now sixty or seventy-five per cent. of the stores—possibly more than that—are getting five cents for the delivery of messages, and I am told that in a great many stores it pays the service of the boys who deliver medicines and run errands. So, taking it all in all, the situation in Philadelphia, so far as the telephone company is concerned, is a very satisfactory one. There is no complaint that a member makes to the Telephone Committee but what is immediately taken up, and generally adjusted to the satisfaction of the committee and of the member making the complaint.

MR. LOWE: I would like to say, though, that these beneficent results have been accomplished by united effort; it could not have been done by an individual working by himself. The department stores and the drugstores are the only stores having these slot telephones. They will not put them in other stores. A neighbor of mine had a telephone that the public used very much, and he got disgruntled over it, and wanted the telephone company to put in a slot 'phone, which they would not do. He said if they would not, he would have his taken out, which he did; but he suffered for the want of a 'phone; and it was only through the efforts of the P. A. R. D. that the present satisfactory condition was brought about.

MR. REHFUSS: I think Dr. Lowe is a little bit mistaken; the telephone company will put slot machines in other places than drugstores and department stores, but they will not give the same rates of commission to the others. It is only drugstores that get this 25 per cent.; the others get no commission, and in most cases they have to guarantee a certain amount per month.

MR. ALPERS: Well, I am from New York, and will have to admit that in this one case Philadelphia is much faster than New York. In New York we have had a slot machine for years, but our commission is much smaller than what the gentleman from Philadelphia states it is there. We get only 20 per cent. commission, and there is now a movement on foot by the telephone people to reduce our commission to 10 per cent. It was my intention before I came here, to organize in New York a strict opposition to this reduction, because it will not pay us to keep the machines in our stores on a commission of 10 per cent. I have in my store four booths for these slot machines, and as I figure it, the rental of that much space is almost equal to the returns, and that is the business way to look at it. Now if the commission is cut down to 10 per cent., I will be suffering a loss by giving up this space to the telephone booths. I want all the information I can get as to the commission being allowed in other cities, because there will be a big fight on in New York over this matter. They want to reduce the commission to one-half a cent on each call. I had in my store last winter an average of 160 calls a day, and reducing that by one-half will amount to quite a little sum in the course of a year. I am not going to give it up without a fight, and I hope the druggists in New York will look at it in the same way.

MR. REHFUSS: That is an illustration of the value of organization. I venture to say that the telephone companies that are operating in Philadelphia would not dare to lower

the commission to the retail druggists, because if they did, I believe the drug trade, or at least 75 per cent. of them, would say "Take your telephones and get out, we will not have anything to do with them."

MR. APPLE: I concur in what Mr. Reh fuss has said. We feel very secure in Philadelphia, for the reason that we have demonstrated to the corporations what we can do—that we will stick together, and when we make demands which are just demands, we will get them.

MR. BODEMANN: What Mr. Reh fuss says is absolutely the truth. Co-operation does the work. As far as the telephone companies in Chicago are concerned, some of the 'phones there are also 'phones of the American Telephone & Telegraph Company—the so-called Bell Company. Before I left I was assured by these offices that they would take up the question of New York with the New York office, and see if they could not better, instead of reduce the commissions there. To the New York druggists I will say that I am sorry that as often as I have written down there to get information as to the conditions in that city, I have never received an answer—never once—but if they will put up a solid front they may rest assured that the telephone company will back down. As far as the profits in Chicago are concerned—Dr. Alpers said he did not receive very much more than the space the 'phones occupied cost him in rental. There are stores down town in Chicago that receive over \$3,000 a year net income from the telephones. If that is not enough rent for the booths, I would like to know how much more rent is wanted.

MR. ALPERS: It depends upon the rent they pay for the store.

MR. C. MEYER: I would like to state that the telephone situation in Baltimore is very satisfactory. A few years since an independent company started up, and the Bell Telephone Company at once began to take notice. The retail association there, in co-operation with the Washington association, went to the Baltimore office and said that unless they were paid a commission of 25%, the telephones would be all taken out. We put up a "bluff" and said 25 per cent., although we only expected 10 per cent. The company agreed to pay 15 per cent.; and about six-months since the independent company was absorbed by the Bell Company. Notwithstanding that, six or eight weeks ago we were informed that they had a meeting and it was decided that after the first of June they would increase the commission to 20 per cent. We did not have to give any guarantee—and refused all offers of the company except a straight commission. In this way we wanted to protect the druggist who only has a few calls; we wanted him to have the benefit, as well as the druggist in the down-town section.

THE CHAIRMAN: Is there any further discussion of the paper?

MR. YEOMANS: Last year the earnings of the druggists of Chicago from this source amounted to over \$145,000, and that was not "stage money," either; it was real money. I have two small stores, not exactly suburban, but away from the center of the city, in which the 'phones are earning pretty close to \$1,000 net, and doing a little better and better every month. We take pains to "boost" the telephone business as far as we can; it is a very profitable thing.

MR. BODEMANN: My motion is that this Section recommend to the branches of the A. Ph. A. that they appoint committees to deal with the telephone situation.

MR. APPLE: Can we recommend to the branches direct? Should not the recommendation come from the general body?

MR. ALPERS: The recommendation should come from the general body; coming from the Commercial Section, which represents only a part of the Association, it would not have as much weight as if it were to come from the general body.

THE CHAIRMAN: Will Mr. Bodemann amend his motion to that extent?

MR. BODEMANN: Certainly I will.

The motion as amended was then put and carried.

THE CHAIRMAN: We will now proceed to the next paper, "The Commercial Advantages of Conducting a Drug Store Exclusive of Side Lines," by Mr. W. J. Frazier, of Wichita, Kansas.

In the absence of the author, the paper was read by Mr. Noll as follows:

THE COMMERCIAL ADVANTAGES OF CONDUCTING A DRUG STORE
EXCLUSIVE OF SIDE LINES.

BY J. W. FRAZIER, WICHITA, KANSAS.

The cherished hope that I may clearly set forth in this paper, in words inoffensive and helpful to my fellow-workers of the pharmaceutical profession, a profession which means so much to every one of us and one in which to succeed should be loved so much that all our energies should be given to it, is the reason I have selected the above subject, to which I most humbly invite the attention and careful thought of this Association.

In my humble opinion the druggists of to-day are tending too much towards scattering their energy and dividing their time with side lines to the everlasting detriment and neglect of their high calling. A calling which for its importance and the essential part it plays in the preservation of the health and happiness of the people should be uppermost in the hearts of all her loyal devotees.

The average druggist of this country does a great deal of the detail work of his own store, not having a sufficient volume of business to justify hiring competent help to do it for him. This being the case, a large part of his time is given to selling post cards, wall paper, soda water, ham sandwiches, oyster stews, etc.; if he permits his store to become an emporium for all these lines as so many do, they will naturally become such an important part of his business that he is liable to grow into a greater dependance on them and think they are more vital and important for his financial success than drugs and he gives them the preference, thereby gradually losing his drug business as well as his love for, or interest in the same. It has been said by Him who "spake as never man spake," that no man can serve two masters; he will either love the one and hate the other or he will cling to the one and despise the other.

It is true these side lines do not require the mental exertion that close application to our profession does, and we say neither are they so remunerative as is the practice of pharmacy, even in its most limited professional sense.

The patent medicine business which has been forced upon the druggists of the country has, we admit, done much to increase the dropping of the dollars into his till, but we unhesitatingly assert, without fear of successful contradiction, that we and the community at large would be better off without them. We because of increased profits and higher ideals and the public because of increased profits and generally better health. To my mind the druggist could not do a more unprofessional or non-ethical thing than to coöperate with a patent medicine manufacturer in guaranteeing it to the consumer, to do the work or money refunded by the druggist ; for in so doing he becomes a monstrous quack and is a stench in the minds of the medical profession, if they take time to notice him at all. The remedy for this is to refuse absolutely to guarantee any patent medicine for any one, for we know not what we do, neither can we know, for the makers keep the contents of their remedies a profound secret. If, however, the facts were known we would, in all probability, in most cases find that their principal virtues lay in the stories or talking points they have manufactured with which to sell their products, which they claim to have been discovered by a lone Indian in the jungles of his haunts, a Chinaman, when trying to accomplish some superhuman act, or a gypsy witch, while trying to extricate herself from the cauldron into which went the fingers of her birth-strangled babe.

The claim made by certain manufacturers of patents or proprietaries, professing to be a syndicate of retail druggists who have culled the best formulas from numerous physicians' prescriptions and made them into proprietaries, and are successfully placing them on the market, guaranteeing them to cure or money refunded, is, in the judgment of the writer, unfair to the pharmaceutical as well as the medical profession, and should be strenuously condemned by both professions.

It has been our observation that if the pharmacist tries as best he can to treat the physician with ethical courtesy, devoting his time and attention strictly to his own profession and leaving side-lines to those to whom they belong, he will soon have all he can do in the way of strictly drug business, and the public will learn to look upon him as a professional gentleman instead of a grappler after everything in sight ; and that he would have an opportunity to become better posted because of his wider experience in his own line of business goes without saying. The physician must respect him if he maintains his professional dignity and a friendly, ethical attitude toward the profession.

This leads us to say, we do not believe the average druggist realizes the full importance of his calling. If he did he would find plenty of interesting and profitable employment for all his time in the practice of pharmacy, and welcome would be the condition brought about in his store where thorough sympathetic co-operation between patient, physician and pharmacist obtained.

In closing, let us say that our admonition to all who love their profession is: Devote all your time and attention to it, leave the side-lines which are foreign to the business of the pharmacist, to those to whom they of right belong, and in your advertising speak the truth, the whole truth and nothing but the truth. Keep busy at your work, maintain your dignity by being ethical, courteous and professional at all times, and your future success and happiness is assured.

THE CHAIRMAN: Is there any discussion on this paper? If not, we will entertain a motion to refer this paper and the preceding paper to the Committee on Publication.

MR. APPLE: I make a motion to that effect.

Motion seconded and carried.

THE CHAIRMAN: The next papers are: "The Commercial Growing of Eucalyptus for Oil," by Edw. J. Binz, of Los Angeles, Cal.; and "Early Closing," by Robert A. Leet, of Oakland, Cal. The authors not being present, these papers will be read by title only, and we will now listen to a paper by Mr. Lyman F. Kebler, of Washington.

Mr. Kebler here read his paper as follows:

A PRACTICAL ASPECT OF STANDARDS.

BY L. F. KEBLER.

It has been my duty for the past fifteen years to pass judgment on medicinal agents of various forms, first as analytical and manufacturing chemist of a pharmaceutical manufacturing house and later as Chief of the Drug Division of the Bureau of Chemistry, and during this time I have had many internal struggles with myself between the goods as actually met with in commerce and the prescribed standards which are in many instances ideal but often impracticable. This condition can of course never be completely rectified but I am sure it can be materially improved upon. Some of the academic standards, as they are called by the trade, have been enacted into law and the responsibilities and difficulties have at the same time been accentuated. The above remarks are applicable more particularly to plant drugs, whole and powdered. In order to clearly set forth the situation I shall cite a number of concrete representative examples.

The United States Pharmacopœia, 8th Revision, designates buchu as "The dried leaves of *Barosma betulina*" which statement is followed by a description of ideal leaves. It is a well-known fact that the article in commerce always contains greater or smaller quantities of foreign material, such as stems, twigs, old worthless leaves, etc., derived from the plant from which the leaves are gathered. These substances are incidentally introduced at the time of collection. The medicinal value of the leaves is naturally reduced or modified in proportion to the amount of this foreign material present. The problem is still further complicated

by the gathering simultaneously of other species of buchu leaves similar to the official leaf and occasionally a few entirely unrelated leaves are found. It will be noted that the impurities referred to above are either approximately inert or possess medicinal properties similar to the official leaf itself. No provision is made by the legal standard for the presence of any of these foreign substances, yet it is impossible to meet with a trade sample absolutely free from contamination of the above character, and the question naturally arises how literally shall the standard be interpreted. This is a problem we are confronted with almost daily in our work and those who are conversant with the situation, can readily understand the difficulties. The Food and Drugs Act is a criminal statute and the courts construe such laws literally. If the position should be taken that all buchu leaves must literally conform with the standard laid down in the Pharmacopœia, the supply would be reduced to a very low ebb indeed and the price enhanced to a prohibitive basis. A rigid adherence to the standard is manifestly impossible. In such an event importers, dealers and manufacturers would be up in arms and properly so. The next question confronting us is: How much of these foreign substances indicated above, should be permitted? Shall it be five per cent., ten per cent., more or less? We must of course be guided by the nature of the impurities to a certain extent and for that reason no definite upper limit of the foreign material of the character indicated has been set. A tentative upper limit of ten per cent. has served as a guide. It is believed that the Pharmacopœia should introduce a definite maximum upper limit of impurities of this character, thus giving the trade a working basis and at the same time remove the onus, censure and criticism from the individual. The chief objection to fixing an upper limit in cases of this character is the fact that certain producers and dealers instead of making an effort to reduce the amount of foreign matter to a minimum, make a studied effort to leave present the maximum amount of such material permissible.

Let us now turn our attention to cubeb berries, another crude drug recognized by the Pharmacopœia. The standard requires this product to consist of "The dried unripe, but fully grown, fruit of *Piper Cubeba*," which is followed by a definite description of the size and character of the fruit. By careful study of this standard any one familiar with trade conditions can readily see that it is vulnerable in several particular points. For example, it limits the character of the fruit to the unripe but fully grown product. In the second place, no provision is made for any foreign material, such as stems, twigs, etc., naturally introduced during collection. It is well known that almost all consignments contain fruit which is neither fully grown nor sound in every particular. The question confronting us is here again: Shall the standard laid down in the Pharmacopœia be adhered to strictly, and if not, what latitude is permissible? Would it be safe to permit the presence of five per cent. or ten per cent. of the sum total of

fully matured berries, undeveloped berries, stems or twigs? Could such a product be safely used in preparing the various medicinal agents of which cubeb berries represent the sole constituent or a material part? In some instances the amount of foreign material comes well within the five-per-cent. limit, but in other instances it exceeds even fifteen per cent. A tentative upper limit of ten per cent. is serving as a working basis. All this difficulty could readily be eliminated by including in the standard a definite upper limit of foreign material of this character.

In the case of belladonna root, additional problems confront us. This commodity is frequently found adulterated with material which undoubtedly has a tendency to materially influence its therapeutic action, as well as that of the finished product made from same. This root often contains "punky" belladonna root and is frequently mixed with such foreign agents as poke root, scopolia root, etc. In the early part of our work that adulterant in a few cases exceeded seventy-five per cent. Such cases are of course readily disposed of, but the question, however, presents itself, Is it desirable to permit the presence of any foreign material of this character? If the foreign material possesses medicinal properties which would in any way influence the primary action of belladonna root or preparations made from same, its presence should be rigidly forbidden. It is true, as contended, many of these roots are gathered by ignorant, uneducated people, and the introduction of small quantities of foreign roots similar physically to belladonna root is naturally to be expected. This undoubtedly deserves consideration, but experience shows that if such sophisticated goods are denied admission into the United States, ways and means appear to be found to eliminate the foreign material. It would seem, therefore, that in cases of this character the proper course to pursue is rigid exclusion.

No product has probably presented more difficulties than saffron. No standard for this product exists, in the present edition of the Pharmacopœia, but in section 7 of the Food and Drugs Act, part 2, it is stated in substance that if an article falls below the professed standard of strength, quality or purity under which it is sold, it is adulterated. This is construed to mean, for example, that if an article is sold under the name saffron it must comply in quality, purity and strength to a good grade of saffron and if there is a standard which can be utilized as is the case with saffron, the use of such standard is perfectly proper. On referring to the 7th edition of the U. S. Pharmacopœia it will be found that saffron is described as "The stigmas of *Crocus sativus*." This is further supplemented by a description of the article and with certain chemical and physical tests. On account of the character of the article and price of same, it is but natural to encounter difficulties. It is well known that saffron has been most liberally adulterated in the past with various substances, such as artificially dyed ligulate florets of *calendula officinalis*, tubular florets of

carthamus, yellow filaments obtained from the saffron plant itself, inorganic material such as calcium carbonate, calcium sulphate, barium sulphate, potassium nitrate, etc. Definite limitations are made relative to the amount of moisture and foreign inorganic material that may be present. The yellow plant tissue, etc., can readily be restricted to the styles derived from the saffron flower itself, but the permissible amount is a fruitful source of contention, in that no definite information is available on the subject. For a time saffron containing a goodly portion of this yellow material was permitted entry with the result that numerous complaints were received to the effect that if the admission of adulterated saffron were continued, parties engaged in the handling of the pure product would be driven out of business. An examination of saffron available in the American market at the time of these complaints showed that the complaints were not well founded. It however prominently brought up the question as to the maximum amount of the yellow material that might be permissible. Viewed from a purely monetary consideration, manipulation of saffron to the extent of five per cent., would be a lucrative business. An investigation soon showed that such a limit would be too stringent, but it was found however that a good grade saffron was available which did not contain to exceed ten per cent. of such material. This is the basis of action at present but numerous complaints are received to the effect that this standard is still too rigid for existing commercial conditions.

In the above I think I have clearly set forth the conditions obtaining and difficulties encountered relative to standards in vogue for certain commodities. I think it is furthermore clearly evident that it is incumbent on those who are charged with providing these standards to include in same, definite information as to the amount of certain foreign substances that should or should not be permitted to be present.

MR. SAYRE; I am glad I was present to hear this paper read, and am very glad it has been presented in this Section, where I think it belongs. I want to say just one word in support of the recommendation that was made. At first sight it may seem rather theoretical and impracticable, but when you come to think of it I don't believe it to be so. There was a time when we did think it impracticable to fix a limit upon the maximum amount of impurity that might be contained in certain articles; and it does strike one at first that it is rather impracticable to fix a limit of impurity in the case of vegetable products, but as a member of the Committee on Drug Reform I have had some work to do on this, and a paper upon the subject will be read tomorrow or the next day. I do hope this Section will support that recommendation, because it will then come from the place it ought to come from—the Commercial Section. It seems to me if we could get the support of this Section, it would be a great benefit. Now when we say we would like to have the maximum limit of adulteration fixed, we do not say that every drug can be standardized at once; but I do believe that the time is coming when we can fix the limit of adulteration. We are doing it in our laboratory constantly. Some of you know, perhaps, that I have upon me the responsibility of the laboratory of the State of Kansas, under the Pure Food Law. Now it is practicable for us to say

what would be the maximum of adulteration we would allow in certain spices, and it is true we can also fix the maximum in the case of buchu, and drugs of that class, and I hope that the Committee will be instructed to fix limitations, and also to give a method by which this maximum amount of adulteration can be ascertained.

THE CHAIRMAN: Is there any further discussion on the paper? Mr. Dohme, haven't you something to say on this subject?

MR. DOHME: I heartily concur in what I heard Mr. Sayre say. I think the question of the ascertainment of the maximum amount of adulteration is a practical one, and will in a great many cases help us out of difficulties. Of course it will in a great many cases meet with opposition on the part of the general public, and will be misinterpreted, I think, to a large extent, but it seems to me that we are perfectly justified in not demanding too much, of a great many products which it is impossible to obtain in any pure shape, in a commercial way, and from my own standpoint I should feel rather favorably disposed towards the proposition.

MR. MEISSNER: This should also apply to a drug being above the standard required by the U. S. P. There should be a limitation either way; it would be only fair to allow a slight variation, because we do sometimes find that where we insist upon the U. S. P. standard, we get a better grade.

MR. WETTERSTROEM: I hardly believe that any percentage would cover in all cases. In our Ohio law some years ago we had this question before us and we tried to overcome it by inserting in the law the two words "material difference." That is, where the product differed materially, beyond the standard of the Pharmacopœia, then it was adulterated. We worked very hard to get that placed in our law, but we could not do it. We finally came to the convention in 1900, and there used what influence we could to have the word "rubric" placed in the law, but even then we find that it is not sufficient. It seems to me if any deviation is allowed, say 10 per cent., they will take 20; or if you allow a 20 per cent. deviation they will want 40, and any figure you adopt will always be taken advantage of and they will go a step further; so I do not believe that any stated figure, in any preparation named in the pharmacopœia, can be used, but that some phrase, such as "material difference," used in the Pharmacopœia, would cover this question.

MR. EMANUEL: It seems to me that there are two ways of enforcing the law—one an arbitrary way and the other a dangerous way. It is dangerous to give the commercial side too much rope.

MR. MEISSNER: Some time ago the State Inspector called at my store and tested some spirit of camphor, and I recently received a communication from the official in charge of the Drug Laboratory to the effect that the camphor ran 90.8, and asking me if I had any more of the goods in stock exceeding the amount of alcoholic strength. I had not tested the last alcohol that I had received, and apparently this alcohol had exceeded the required strength, and according to the State law it was as illegal as if it was under.

MR. SAYRE: We have found the strength of spirit of camphor in the State of Kansas as high as 17, and as low as 3, and all proportions of water and alcohol. As to the percentage of alcohol, that is, whether you have a 95 or 94 per cent.—or a 188 proof or 190 proof, as the case may be—we found that there was being shipped into the State nothing but the 188 proof. We made complaints to the distiller, and the distiller said it was perfectly absurd for the officers of the food and drug law, or for the United States pharmacopœial authorities, to insist upon any higher than 188 proof being shipped into the State;

that it would require a change in their outfit, costing thousands of dollars, to make a different kind of alcohol, even a fraction more per cent. than that. Of course I accepted that statement and reported it to Topeka, and then they authorized me to correspond with the different manufacturing houses and distillers and ask them about what kind of alcohol they were putting out, and what kind of alcohol was being received. One large manufacturing house reported on the specific guarantee from 100 different barrels, and none of them went below 96 per cent. They said that usually, in order to get the official strength, they reduced it with water; that they always considered it cheaper to pay the freight on alcohol than on water; and the manufacturers and most of the distillers said it was perfectly practicable to put out a 96 and even higher percentage of alcohol.

THE CHAIRMAN: Is there any further discussion on the paper? It seems to me that possibly the latter part of this discussion has gone a little wide of Dr. Kebler's paper. The Chair would suggest that there ought to be a motion offered to the effect that the Section concurs in the views expressed by the paper.

A motion was here made, seconded and carried that the Section concurs in the views of Mr. Kebler; that certain limitations should be made in the fixed standards of certain drugs.

THE CHAIRMAN: Inasmuch as the remaining papers on the program, while very interesting, are not exactly original, having been before presented to the Pittsburg Branch, and as it has been decided that we would forego our meeting for to-morrow afternoon and attempt to close up the business of this Section to-day, we will now listen to the nominations for officers for the Section for the ensuing year, and then proceed immediately to the election of such officers.

MR. MEISSNER: I take pleasure in nominating for the office of Chairman of this Section for the ensuing year, the present Associate, Franklin M. Apple.

THE CHAIRMAN: Are there any further nominations?

There being no further nominations, on motion duly seconded, nominations were closed, and the Secretary cast the unanimous ballot of the Section for Mr. Apple as Chairman.

THE CHAIRMAN: Will some one nominate a member for Secretary?

Mr. Benjamin E. Pritchard, of Pittsburg, was here placed in nomination for Secretary, and on motion, duly seconded, the nominations were closed, and Mr. Pritchard was unanimously elected.

THE CHAIRMAN: Before proceeding to the nominations for Associates, I want to call your attention to a deplorable thing that has happened this year, and has happened before, and that is, that the Associates in this Section have all come from one portion of the country. This makes the work of the Chairman hard and hampers the whole Committee, and I would suggest that this time we try and scatter them. If you can find someone from the Pacific Coast, another from the middle West, and another from the West, say—inasmuch as the two officers of the Association are from the East—it would make the work easier.

The following were placed in nomination for Associates on the Committee: Mr. Sidney Yeomans, of Chicago; Mr. Charles Ford, of Denver; and Mr. W. Withers Miller, of Richmond.

On motion, duly seconded, the Chairman was authorized to cast the unanimous ballot of the Section for the gentlemen named; which was accordingly done.

THE CHAIRMAN: I have the honor of presenting to you Mr. Apple, Chairman for the ensuing year.

MR. APPLE: Mr. Chairman and Fellow Members of our beloved Association: It affords me pleasure, indeed, to accept the chairmanship of this Section. As you well know, I have served in the same capacity in another Section—that of Practical Pharmacy. I realize that while it has not received the attention from the rank and file of the members of the Association, that it should have had, that nevertheless this is a very important section. You must concur in that, when you remember what our worthy President brought forth in his address, and also the admirable things in the address of our chairman. Remember when you elect a Chairman of this Section that he is not a working committee of one, with whom is associated the Secretary and three Associates. They simply can be guiding spirits for you, and when they accept service from you, you must not refuse to accept service from them. Hence, we ask now for the support of all of you, and of all your friends, and that you will help us to make this Section a grand success during the ensuing year—and kindly do not let us ask in vain. I thank you again.

MR. MAYO: It affords me pleasure to introduce to you the only "Consulting Engineer of Pharmacy" in existence. Some people go out of pharmacy because they have made enough money to quit; some go out of it because they have lost so much they can not remain in it, and some men go out of it because they die. This is the only man I know of who has gotten out of Pharmacy because he knows all that can be found out in it, and wants to give to others the benefit of his information. I think it eminently fitting that this gentleman should act as Consulting Engineer for this Section, and tell us how to make money, so that when we have been in the business twenty-eight years, as he has, we too can go out.

MR. PRITCHARD: Mr. Chairman, I have never had a load so heavy to carry on my shoulders as that which Mr. Mayo has laid on me. I must confess that there were other reasons than those he assigned, for my leaving the business; he forgot to mention them to you. The real reason I left my store was because I had a clerk who had worked for me fifteen years, and he concluded it was about time for him to be boss, and I could not work under him. That does not indicate that the clerk made more money out of the store than I did, but it does indicate that if you have a real good clerk, and have built up a fairly good business, and that clerk thinks he has done his share towards building it up, you ought to give him a chance; so I thought when an opportunity came, and I had enough to do with my other business, without conducting a drug store, I would drop out and let my clerk, who had been conducting the business for fifteen years, have a piece of the pie. In the affairs of the Western Association, in Pennsylvania, and of the paper I conduct in connection therewith, I find that I have all that it is possible for one man to attend to. In talking with the Secretary of the Pennsylvania Board of Pharmacy, a few days ago, I was compelled to acknowledge the fact that notwithstanding I had put in 40 years in a retail drug store (28 years for myself) I have actually learned more of pharmacy in the two years I have been out of business, than during the 40 years I was in harness, because during those 40 years my mind was continually occupied in trying to keep the cash register going, so that the income would be sufficient to meet the outgo. So if you want to find out things, and know as much as I am alleged to know about pharmacy, by a friend of the "American Druggist," get out of

the business and be a "Consulting Engineer," and then you will get jobs like this that will pay you handsomely, and enable you to make a fine living.

THE CHAIRMAN (Mr. Apple): It is certainly very assuring to the Chairman to have a Consulting Engineer right at his hands at any time he needs assistance, and I am sure that he will find me consulting him quite frequently. Are any of the Associates here, that they may be installed? Mr. Anderson, will you escort Mr. Ford to the platform; and you, Mr. Ladish, perform the same office for Mr. Yeomans?

Mr. Yeomans and Mr. Ford were here escorted to the platform.

MR. YEOMANS: Mr. Chairman and Gentlemen: All I can do is to make a grateful bow, on behalf of Mr. Ford and myself.

THE GENERAL SECRETARY: Mr. Chairman, I heard the name of Mr. W. Withers Miller, of Richmond, mentioned for Associate. I do not think Mr. Miller is a member, unless he has joined at this meeting, has he?

THE CHAIRMAN: He has not. I presumed from the fact that he was requested to act as Secretary, he was a member of the Association.

MR. ANDERSON: If Mr. Miller is not eligible, I will nominate Mr. Berger, of Florida.

On motion, duly seconded, the nominations were closed, and Mr. Berger was unanimously elected an Associate on the Committee for the ensuing year.

MR. BERGER: Gentlemen, I appreciate the honor and will certainly be glad to do everything I possibly can to assist the Chairman and other associates in their work. I thank you.

By a motion duly made, seconded and carried, the thanks of the Section were extended to the outgoing officers for the faithful and efficient manner in which they had conducted the business during the past year.

On motion, the Section here adjourned.

Papers read by title:

SUNDAY CLOSING.

BY R. A. LEET, OAKLAND, CAL.

There are but two possible reasons for keeping a drug store open on Sundays, either the money that can be made by keeping open, or else the desire to serve the community represented.

In discussing the advisability of Sunday closing, it is necessary to take into consideration the problem which it involves to the druggists at large throughout the country. To some of these it is certainly a much simpler proposition than it is to others.

I heard it stated recently, that as a result of a widespread investigation based on data taken from all parts of the country, the average income of the physician in the United States is estimated to be less than \$2.00 a day. I don't know if the average income of the drug store proprietor has been estimated, but I think that it is safe to say that if we could canvass the sit-

uation as widely, we should find that it is not greatly in excess of the cost of living. Accordingly, one of the first things that he has to consider in any new proposition put up to him, is whether or not he can afford it.

I think that the proposition of Sunday closing appeals strongly to the average druggist throughout the land, and I think that the hesitation in adopting it is mostly due to the fact that he does not feel sure that he can afford it. I know that the desire to serve his community, to be always at hand when a case of real urgency presents itself, also influence him largely. But I think it goes without saying that any proprietor would be very glad to join the Sunday-closing movement, if you can convince him of these two points; that it would not be at a pecuniary sacrifice, and that he would not have to account to his conscience or his clientage as to his service to the community which he represents in their time of need.

It is only because that the firm with which I am connected has had experience that may assist some of the druggists who are considering this question to come to a conclusion that I have consented to write this paper, and give the facts that have been developed in our own case.

We commenced closing our stores on Sundays except between 9 a. m. and 2 p. m. in 1907. At that time our business on Sundays was a very substantial portion of our whole business—large enough so that if we lost it without any corresponding gain through the week, we should be very seriously crippled.

After nearly three years now, we feel that we are prepared to speak on the question of pecuniary loss, and feel that if there is any at all that it is so very slight that the advantages and benefits accruing far more than offset it. Our receipts of course were very much reduced on Sundays, but we think that they were sufficiently augmented during the week to offset the reduction. We feel certain that as a result of our better hours, we have had a choice in the selection of clerks such as we would never have had otherwise. We know that good men have been influenced to place their application with us by reason of our Sunday closing and we feel that the morals of our working force are on a higher plane. We feel that on these accounts alone we are more than repaid for the stand that we have taken; and be it understood, we are absolutely independent in this movement, having closed our stores regardless of the fact that our competitors all around us keep open. So much in answer to the question of pecuniary loss.

Now as to the matter of serving the public in their necessity. In our case we have closed our doors and drawn our curtains, but we have had a notice on the doors that we would still be ready to fill prescriptions and supply urgent requirements. By this arrangement we have been able to adjust our shifts so that it is not necessary for any man in our employ to work all day on Sunday oftener than about once in eight weeks.

We believe that in smaller communities, or in the case of stores less

prominently located, the stores could be closed absolutely except within certain hours, and that any urgent need could be taken care of by having the address of the proprietor or his clerk posted on the door so that he might be called on. We adopted successfully such a course as this latter with regard to our night clerk service. We discontinued a night clerk service after it had been in force for thirty years, and we have yet to hear a substantial complaint either from a physician or a customer. The number of impositions have been very small indeed, and in fact the number of calls has been minimized. As a matter of fact we found by keeping actual count of our calls for a period of a year before abandoning our night clerk system that the percentage of really necessary calls was very small indeed, and we feel sure that if a drug store is kept open for a certain few hours during the day on Sunday and perhaps for one hour in the evening, and the public made fully aware of the fact, that the percentage of calls outside of these hours that are entitled to consideration will be extremely small.

Accordingly I think that the druggist who can satisfy himself that he is justified in adopting Sunday closing from the dollar and cent point of view, can readily find a way to see that his clientage suffers no great inconvenience by reason of his action.

Now there are some few important details to be considered once Sunday closing is decided upon. In the first place, it is very important that you should not take any action that would appear arbitrary to your customers. You will find them practically unanimously in favor of any movement for the betterment of hours if it is presented to them properly, and yet the same people will freely criticise you as being independent and indifferent to their urgent needs, if you do not take them into consultation regarding any shortening of hours of your service to them. Moreover, by acting arbitrarily you will leave an opening for a competitor to insinuate your indifference of suffering and to emphasize this readiness to nobly serve every hour of every day, Sundays as well as all other days.

In our own case we first of all sent out a personal communication to each physician, telling him it was our intention to close, if our plan was agreeable alike to the physician and the community at large, but emphasized the fact that regardless of our desire to better our conditions, and that of those in our employ, we realized that our first duty was to minister to the needs of our patrons, and that in the case of a very small percentage of unfavorable replies, we should consider our plans. We then sent a similar notice to each customer whose name appeared upon our books and simultaneously placed large advertisements in the local papers, setting forth our reason for making the movement, and asking for an expression of approval or disapproval. The returns far exceeded our expectation. The personal communications were responded to almost without exception, and we received literally thousands of signed coupons cut from the papers. In

addition to this, we received coupons bearing long lists of signatures of the employees of some of the larger establishments, and not a few expressions of approval from labor organizations. There were but two unfavorable answers amongst the thousands of replies received.

With this substantial endorsement, we entered upon our plan with enthusiasm, and at this time, after nearly three years of trial, we repeat what we have often said before, that there has been no single action in connection with the conduct of our business that has afforded us so much satisfaction as this one of Sunday closing.

I urge upon the druggists of the country its favorable consideration. If we are to make our calling attractive to the better class of men, we must make it a business rather than a grind. With the advent of men of high standards of living, competition will be on a fairer basis, and the returns for our efforts will be more satisfactory.

Conditions have been bettered in almost every other line of business, and it is high time that they should be bettered in ours. Already our calling has suffered much by reason of the turning away of our young men to callings that allow of more opportunities of development and culture, and social enjoyment by reason of their shorter hours.

Let us do what we can to further and prosper the movement for shorter hours, for by so doing we increase the welfare and advance the respectability of our calling.

THE COMMERCIAL GROWING OF EUCALYPTUS FOR OIL.

BY EDWARD C. BINZ, LOS ANGELES, CAL.

The extensive advertising of eucalyptus has aroused considerable interest in its growth as an industry and, among its many uses its possibilities for the manufacture of eucalyptus oil. There is no doubt that in time, eucalyptus will rank with gold and petroleum in making the reputation of the state of California.

Eucalyptus has been brought to the attention of the public and into popular use, that the pharmacist and the physician are now realizing that this is a valuable drug and that it has been neglected by them for some years past.

Eucalyptus now holds an important place in genito-urinary work and with the gynecologist, with the surgeon, the nose and throat specialist, the skin specialist, and general practitioner.

Eucalyptus is a good anti-malarial, an antiseptic, a germicide, a stimulant to indolent ulcers and all mucous membranes, is a good pus destroyer and an insecticide.

In taking up the commercial possibility of the manufacture of the oil of eucalyptus we must consider all phases of the same.

First, the supply and demand: this we know, is what will regulate the price and is what influences the advisability of entering upon the manufacture of the oil.

The demand, to-day, as far as my observation goes, does not exceed the supply. I have called upon the wholesale druggists from coast to coast and not any of them are having trouble in procuring all the oil at any and all times and at the low prices of 30 and 35 cents per pound. For this price they obtain an oil which fills the requirement of the pharmacopœia and that is all the average pharmacist seems to exact. The oil that they buy is a very good commercial oil and may be produced at a fair profit, in Australia, at the present price, as for several reasons labor is cheaper. Men, women and children of the poorer classes gather great quantities of the leaves and sell them to the distiller at a nominal price. No attention is paid to the variety of the eucalypt on which they are grown. The wage paid to the employees of the distiller is from \$1.25 to \$1.50 per day.

They have large forests closely grown, material in fact, that will keep a plant busy all the time, and an established market in England and in all of Europe as well as America.

They have varieties of the eucalyptus that will produce or yield from 3 to 4 per cent. of oil and will run high enough in eucalyptol content to stand dilution and yet bear the test of the Pharmacopœia.

In California our groves (and groves is what they are, not forests) are too far apart to make it possible for any one to establish a large plant for the distilling of oil. We are obliged to haul the leaves for from 3 to 4 miles. This means a team, wagon and a man, at the expense of at least \$4 to \$5 per day for it takes time to load and unload the leaves. Wages here are from \$2 to \$2.50 per day for ordinary labor which is not very plentiful at that.

In California, we have principally the *Eucalyptus globulus* and, in fact this is the only variety grown here at present, in quantity sufficient for manufacturing oil and securing a product that will stand the Pharmacopœial test. Our oil will go way beyond on the required eucalyptol content, but our yield is only a fraction over 1 per cent. of the amount of the leaves handled. This means that we must handle a ton of leaves to get 20 per cent. of oil.

Our market is limited and we cannot at present cost of production compete with oil that is sold at 30-35 cents per pound. The jobber as well as the retail pharmacist only recognizes eucalyptus as eucalyptus and does not consider quality. I mean that this is the case in commercial channels.

California may, in time, after the groves being now planted mature, hope to compete with Australia in the oil manufacture, but never, under present conditions, to any great extent.

In securing our material, the leaves (as the leaf only produces oil), we have to wait until the woodman cuts the trees for cord wood or for lumber. It takes too many leaves for the regular trimming of the trees to be practical for oil making.

California oil is superior in quality to the Australian.

Eucalyptus oil is just as different in its therapeutic effect as to the variety from which it is distilled as are the different pine oils. We know the *Pinus pumulus* is not *Pinus sylvestris*, and so it is with the various eucalypts. There are over 150 varieties of the eucalypts, and while they are all similar and belong to the same family of the *Myrtaceæ*, the oils are not the same in therapeutic action.

I am satisfied, after careful consideration of the literature at my disposal, that the physiological effects as laid down in our *Pharmacopœia* are based upon the experiments made some time ago, at the first discovery of the *Eucalyptus globulus*, and I think that this was the only tree known of the eucalypts at that time. The experiments were carried on by Prof. Gimbert, of Italy, and by Prof. Carl Binz, of Bonn, Germany. Since that time physicians have been using eucalyptus oil, and some with the effect as laid down in these experiments, while others have failed and condemned the remedy. These failures, in my estimation, have been due only to the use of inferior oil, or possibly an oil not from the *globulus*.

I am anxious that the pharmacist should realize the fact that there is a difference in the many oils of eucalyptus as to their variety. You may ask: "If eucalyptol is the active principle of the oil, then why not use the eucalyptol?" True; but the oil contains a good percentage of pinene which nature produced in the leaf and which is just as essential in enhancing the therapeutic effect as is the eucalyptol. We know that you do not get the same action from strychnine as you do of *nux vomica*.

I offer this as food for thought, because, if we can educate the pharmacist as well as the physician to this fact, that the pure oil of *Eucalyptus* is essential if they expect results, we know that in time they will appreciate this fact and will then be willing to pay a price that is consistent with pure, first-class oil.

In conclusion, I would like to say that I think there is also a place for a distilled extract of eucalyptus, that may in time take the place of witch hazel. I trust this paper will appeal to the members of the Association, and that the subject may have proved interesting to all of you.

MINUTES

OF THE

SECTION ON EDUCATION AND LEGISLATION.

FIRST SESSION—THURSDAY MORNING, MAY 5, 1910.

The first session of the Section on Education and Legislation was called to order at 10:30 a. m. by Chairman Charles H. LaWall, of Philadelphia, who announced that the first order of business before the section was the reading of the Chairman's Address. In the absence of any of his Associates on the Committee, he said he would ask President Rusby to preside, while the Address of the Chairman was being presented, and Mr. Rusby took the chair. Mr. LaWall then presented his Address as follows:

ADDRESS OF THE CHAIRMAN.

Gentlemen: When more than two hundred years ago Leibnitz said "Give me control of education for a generation and I will change the world," he uttered an aphorism which needs but the interpolation of the word "pharmaceutical" to make it applicable to our own time, country and profession.

Education and legislation are two subjects concerning which there should be a natural relationship, but unfortunately this relationship has at times been somewhat obscured by a lack of coördination between the theory and practice of attaining results in both instances. If educators were more frequently found in the ranks of the legislators or if legislators were sometimes better educated concerning the specific subjects with which they are dealing, there would be much less friction. Energy which is now dissipated in attempting to move a body in diametrically opposite directions at once would be applied with much greater effectiveness if applied harmoniously with regard to ultimate results rather than present emergencies.

It is always found that where the cause of education is properly advanced, legislative improvement results as an inevitable corollary, and the reverse of the proposition is also true, for wise legislation always stimulates progress along educational lines. A prominent university president is authority for the statement that "the ideal education is where a student learns things that he is not going to use in after-life by methods that he is going to use." This is more in the nature of a defense of past conditions, especially along general educational lines, than a true statement of fact as applied particularly to professional education. In pharmacy, as well as in medicine, almost every subject taught is of direct value to the student in the subsequent practice of his profession.

Education in any profession and especially in pharmacy should strive to develop the

individuality of the student. The graduate should be equipped to deal effectively with any problem which may arise after he has been thrown upon his own resources and he should be taught, not so much to memorize facts as to learn where and how to lay his hands upon information of a specific nature.

There should also be an attempt to develop what is known as a scientific imagination. This faculty enables its possessor to foresee possibilities and suggest means of accomplishing results and to successfully cope with unusual problems when they arise.

Much of the responsibility for results in education naturally lies with the teacher rather than in the system of instruction followed. The effective teacher will so stimulate the interest of his pupils that they will discuss out of the class room subjects and problems that have been presented to them within its walls. In other words, the teacher must possess a contagious form of education, which must not be counteracted by the sterilizing effects of inattention or lax discipline.

While the individuality of the teacher is recognized as a factor of prime importance, it must be admitted that it counts for much more when combined with a system of instruction which is fundamentally sound and which is so elastic as to admit of constant improvement and change to keep pace with the progress which is continually being made in the various sciences which constitute the foundation of a pharmaceutical education. A didactic or lecture system based upon notes or text-books followed year after year with occasional revision of minor points is not sound. A lecturer who reads from manuscript or text-books is likely to do so perfunctorily and the student fails to gain inspiration and interest, while the teacher who previously prepares for each lecture by consulting the latest information upon the subject and who imparts it in a manner that indicates his own personal enthusiasm in the work will send out into the professional world the kind of men who are needed to develop and perpetuate the highest ideals.

Lecture experiments of an illustrative character must be successful in order to be convincing, and nothing causes a student to lose interest more quickly than a neglect of this consideration. Lecture experiments should be given at such times during the lecture as are most suitable and effective from the teaching standpoint, and it is rarely a good plan to conclude the lecture first and then lump all of the experiments together as a finale. Such a procedure produces a chaotic impression upon the mind of the student and often leads to the acquirement of what is known as "misinformation," a condition which is all too common and the seriousness of which is often overlooked by teachers.

Another important point is the necessity for synchronism between lecture and laboratory instruction. The student who does not have an opportunity to apply practically the knowledge of a given subject until weeks after the subject has been theoretically presented, or, what is still worse, who has practical work in connection with subjects that have not yet been presented theoretically, loses much in comparison with one who has an opportunity to apply practice with theory throughout his course.

The effectiveness of educational work is furthered by properly stimulating healthy competition, and most institutions, in recognition of this fact, offer prizes which are awarded at the end of the respective courses. What is needed still more is some practical method of rewarding continuous effort during definite periods, so that at certain times during the college year a student who merited approbation for the character of his work would receive some tangible reward in recognition of the fact. This might take the form of an honor badge, of no great intrinsic value, to be worn for an assigned period. At the expiration of this time it would either be re-awarded or transferred to some more deserving student. The effect would be to stimulate continued effort, which is the only kind that gives lasting results, and every possible plan should be adopted to discourage the idea so frequently held by students that it is passing the final examinations that constitutes an education. With this end in view, examinations should be relegated to their proper place in the course and not magnified unduly as to their im-

portance. It is well to occasionally hold a written examination where the student is permitted to bring and use his text books. Questions may be framed so as to compel the use of the reasoning powers and the student is at the same time instructed in the art of looking things up, which is sometimes more important than trying to remember them bodily.

In all educational work it will be found difficult in some cases to counteract the sterilizing effect of the influence of cynical druggists of former generations, who, while acting as preceptor, take especial pleasure in shattering the ideals of young and enthusiastic students, thereby retarding the professional advancement of pharmacy.

There is a question whether it would not be advantageous to construct an education system in pharmacy based upon a judicious plan in which electives are permitted. Many students enter a pharmacy college with a well-defined idea of their future life-work. Some would prefer to specialize in chemistry, others in microscopy, while still others expect to devote their attention to pharmaceutical manufacturing, and by having a minimum requirement for these and other major subjects, it would enable many students to avoid spending time upon subjects for which they would have less practical use than some others.

In this connection it may be suggested that the time is now ripe for the introduction of elementary bacteriology into our pharmacy colleges as a compulsory branch of study. Information on this subject is of prime necessity to the pharmacist, especially in connection with antiseptics and sterilization, both of which are becoming popularized and are even receiving a certain amount of attention in some of our public schools.

Business ethics is also a matter that should receive more attention than has been given it in the past. If this subject had been properly and intelligently presented by forceful and convincing teachers in all of our pharmacy colleges during the past twenty-five years, some of the ills which now beset the profession would not now exist. When a student has been trained in a drug store by a preceptor who has lax views regarding the sale of certain articles, and who perhaps belongs to the class of substitutors, and if during his college course he hears no word of condemnation of such practices, he is tacitly encouraged to do as he sees others do and is not to be judged too harshly if he follows such practices when he embarks in business for himself.

Conditions regarding entrance requirements are at present in unstable equilibrium and the ultimate remedy will be found in the hands of the legislators who frame future registration laws. There is danger of excessive zeal in this respect working against the best interests of the profession from a practical standpoint. A registration law requiring graduation from a reputable college, four years' high-school training and four years' practical store experience is a combination that would cut down registration to a point where the proprietors would rise up in unanimous opposition, as clerks would be practically unobtainable until a revolutionary readjustment had taken place.

In this connection I would call attention to the injustice of many State laws which at present require an applicant for registration to obtain four years' experience in a retail pharmacy, although the practical work may have been largely confined to the soda counter, while an applicant who has had many years of experience in government or any other hospital service, where the whole time may have been spent in compounding or manufacturing medicines, is denied the right to take the examination under the State Board.

The beneficial effect of the few States that have judiciously raised the standards of pharmaceutical education has been already felt, even in parts of the country that would seem to be remote from their influence, and there has been a total disappearance of the diploma mills which some few years ago handed out educational goldbricks to the ignorant or mercenary.

Great progress has been made in recent years in educational matters as they apply to the colleges, but the necessity for education in its broader sense, where all are students,

has not yet been realized by the rank and file of the profession. Of pharmacists in general, how many have kept up their studies and their interest in the purely professional side of the business, save when it has been a matter of dollars and cents? How many know less now than when they were graduated, losing sight altogether of the fact that the acquisition of a college diploma is but a single rung on the ladder of education? How many toss their pharmaceutical journals aside after a cursory and perfunctory glance at the headlines and the news items and are oblivious or indifferent to the necessity of keeping alive to the numerous discoveries and ever-changing requirements of the progressive sciences which constitute the foundation of our profession? To one who is careless in this respect the very terminology becomes unintelligible in a few years. You will look in vain in a dictionary of ten years ago for such terms as bacterin, hermode, kinase, opsonin, radium, radioactive and numerous other words which are in constant and current use at the present time.

The blame for much of this lack of progressiveness in certain directions undoubtedly rests upon the individual. The pharmacist should be an educator of the public along broader lines than ever before, and in fulfilling the function of a popular educator he becomes convinced of the necessity of keeping better posted himself, and thus the cycle is completed. He has, however, been remiss in his duty toward the public in some important matters. It has been stated, and truly, by a well-known medical authority, that "the only instructor of the public in matters pertaining to disease has been the charlatan who advertises in the daily press." The pharmacist, having participated in the profits arising from the sale of worthless or even harmful nostrums, without a word of protest, is almost entirely responsible for conditions which are now recognized as being inimical to the best interests of the profession. Too many pharmacists are embryo nostrum manufacturers, only awaiting a favorable opportunity to reap the golden harvest of profits accruing from the sale of preparations whose very existence is dependent upon misrepresentation of their value and the credulity of the purchaser.

To the pharmacist belongs the duty and the privilege of disseminating information concerning recent food and drug decisions and notices of judgment, and also concerning the work of the Council of Pharmacy and Chemistry of the American Medical Association. Has he qualified himself to fill this important position? In most cases, he is the one requiring instruction. Has he aided in educating the public with regard to the reliability of newspaper advertising of medical specialties and nostrums? On the contrary, he frequently gives tacit endorsement to such preparations by allowing his name to be used in connection with such advertising as that of a reliable (?) druggist from whom such preparations may be procured.

It is an indisputable fact that much of the newspaper advertising of cures and nostrums is an insult to the intelligence of the average well-informed reader, but how often do we find the pharmacist raising his voice in protest against such barefaced misrepresentation as characterizes the preparations which are constantly being exploited through the medium of newspaper advertising?

The necessity is now greater than ever for standing shoulder to shoulder with our brother pharmacists and with physicians in the important work of advancing the interests of the twin professions, medicine and pharmacy. Very recently there have appeared in reputable periodicals, articles, which from the unfairness in the treatment of the respective subjects should have aroused a storm of protests not only from individual pharmacists but from the pharmaceutical journals as well. One of these was a condemnation of the use of Latin in the nomenclature of science and in prescription writing, in which no mention was made of the advantages of conciseness and exactness. The other was an attack upon the metric system in which its primary advantage, *i. e.*, the commensurability of the unit, was entirely ignored.

Unless the rank and file of pharmacists soon awaken to a sense of their responsibility

ties in the foregoing matters as well as in other directions not mentioned, there may come a fulfilment of the frequently expressed prophecy of a division of the members of the profession into two classes, one of tradesmen whose energies shall be restricted to handing out what somebody else has put up, and the other of professional pharmacists in the true sense of the word, who shall enter into the heritage which has awaited them for many years.

The pharmacist fills a peculiar place in the estimation of the public. He is looked to for counsel and advice upon subjects innumerable, and when he once realizes his responsibility to the public, his fellow pharmacists and himself, there will arise a new era in pharmacy, in which education and legislation will be paramount issues, free from domination and uncontrolled by class or local factors.

To conclude in the words of Milton, which are peculiarly appropriate :

"I shall detain you no longer in the demonstration of what we should not do, but straight conduct ye to a hillside, where I will point ye out the right path of a virtuous and noble education; laborious indeed at the first ascent, but else so smooth, so green, so full of goodly prospect and melodious sounds on every side that the harp of Orpheus were not more charming."

President Rusby said it was very refreshing to him to hear an address of this kind on the subject of education—an address that went right down to the roots of the matter, and the workings of the human mind. He did not hear the title of the address as read, but he thought it might well have been called "The Psychological Aspects of Education." He said he had very greatly enjoyed it, and this was the kind of address the members wanted to hear, where the principles of teaching were considered. He thought a good many of the members, and especially the pharmaceutical educators, were apt to forget that there was a science and an art of teaching; and the art of teaching was just as much a subject of study and research as any branch of knowledge that was taught the students.

Mr. Hallberg said he had listened with great pleasure to this splendid address, but he had one criticism to offer. The medical profession had been separated in the minds of many into two classes for many years—the doctors and the physicians; and he believed that those engaged in the practice of pharmacy should also be separated into two groups, druggists and pharmacists, and he would have enjoyed the reading of this address more if the Chairman had distinguished in the use of these two terms. He thought there would have been a little more suggestion in one or two of the points made if he had said "druggists" instead of "pharmacists," and *vice versa*.

Mr. Stewart moved that a Committee on Chairman's Address be appointed, as it was certainly full of meat, and it would be a pity to let it go without further attention.

This motion was seconded by Mr. Kebler and Mr. Apple, and carried.

The Chair said he would appoint as a Committee on Chairman's Address Messrs. J. T. McGill, of Nashville; A. B. Husted, of Albany, and A. B. Lyons, of Detroit.

Chairman LaWall resumed the chair.

Mr. Remington said, in connection with the subject brought up by Mr. Hallberg, that he felt that, while this proposition of separating the druggists and pharmacists and making two separate departments of activity in pharmacy was coming, he supposed, as the tendency seemed to be that way, and nothing would stop it, he believed it would be much better if the druggist would become more of a pharmacist, and a pharmacist more of a druggist. Instead of a separation between the two classes, he thought the pharmacist should become more of a business man, and become more familiar with commercial transactions than he was to-day; and he thought certainly the hope was justified that the druggist would become more of a professional man, and know more about pharmacy itself.

The Chair called for the report of the Secretary as the next order of business.

Secretary Johnson said it had been rather difficult for him to get up much of a report on legislative matters in the various states, by reason of the fact that very few legislatures had been in session during the past year, and on account of the early meeting of the Association this year, many bills which had been introduced in legislative bodies it has been impossible for him to learn the final action upon. He then proceeded to read his report as follows:

REPORT OF THE SECRETARY OF THE SECTION ON EDUCATION AND LEGISLATION.

During the past year legislation affecting pharmacy, both national and state, has been largely concerned with narcotic and liquor questions. These questions seem to remain live issues from year to year. The general trend of this experimental legislation is to take from the hands of the druggist the responsibility of dispensing these substances except upon the written order of a physician. In the state legislatures the subject of itinerant vendors seems to come next in importance. An occasional bill is found concerned with the purity of drugs or with methods of licensing pharmacists.

STATE LAWS AND BILLS.

Alabama. A pharmacy law passed in August, 1909 provided for the licensing of pharmacists and assistant pharmacists, and prohibits the sale of certain narcotics except on the prescription of a physician, dentist or veterinarian. The name of the person or the kind of animal for which the narcotic is intended must appear. Such prescription is not to be refilled. The law also provides that itinerant vendors must pay a two hundred dollar license tax.

Arkansas. Two bills were defeated, one requiring the word "poison" to appear on certain patent medicines, and one providing for a license to sell patent medicines.

California. Laws passed in 1909 provide for licensing druggists on twenty years' experience without examination, give state board of pharmacy the power to revoke license of a druggist addicted to narcotics or liquor, provide for the sale of certain narcotics on physician's prescription only, and restrict the sale of carbolic acid in less than one pound quantities to a solution containing 10 per cent. acid and 10 per cent. alcohol except on a physician's prescription. A bill failed which proposed to transfer the enforcement of the food and drug law from the board of health to the board of pharmacy.

Colorado. The anti-narcotic ordinance of Denver restricts the sale of carbolic acid, morphine, laudanum, opium and cocaine except on physician's prescription.

Connecticut. A law passed in 1909 creates a commission of pharmacy, provides for the registration of pharmacists and assistant pharmacists and for the registration of stores. The commission of pharmacy must certify to the standing of a pharmacist before he can secure license to sell liquors. This certification must be renewed each year.

Delaware. Bills were defeated to allow physicians to operate drug stores, to give physicians greater power in the enforcement of the state food and drug law, and providing special blanks to be used when liquor prescriptions were written.

Idaho. The pure food law was placed under the direction of the state board of health. A narcotic act was passed providing against the sale of certain drugs except on order of physicians. The local option law requires that druggists in "dry" counties can sell liquor only on physician's prescription, such prescriptions to be filed with the county auditor the first of each month.

Indiana. An itinerant vendors bill and a bill registering all physicians failed.

Iowa. Laws were passed regulating the sale of liquor, cocaine, ergot, cotton root, etc., and permitting the sale of poison fly paper and denatured alcohol. Bills failed permitting the interchange of certificates and prohibiting the sale of liquor by pharmacists.

Maine. Maine has a new law which provides that the dispenser of soda fountain drinks must inform the customer verbally if an imitation flavor is being used.

Maryland. A food and drug bill modeled closely after the federal law was introduced into the legislature, also a new pharmacy bill which provides that no pharmacy be operated under a certificate other than that of the actual owner.

Massachusetts. A bill was introduced authorizing the board of pharmacy to suspend the certificate of druggists found guilty of violating the cocaine law.

Minnesota. Laws were passed regulating the prescribing of cocaine and liquors by veterinarians, relating to the sale of mallein and tuberculin, also regulating the sale of paris-green and other insecticides. A law licensing peddlers and transient merchants was passed and later declared unconstitutional.

Montana. Bills failed to pass relating to the labeling of prescriptions containing morphine, cocaine, etc., and the licensing of itinerant vendors.

New Hampshire. A law was passed regulating the manufacture and sale of preparations containing cocaine. The pharmacy law was amended to allow exchange of certificates.

New Mexico. New Mexico has a new law regulating the sale of certain poisons, also an act making it unlawful to keep or maintain a "hop" or opium joint.

New York. Great interest seems to center around the proposed pharmacy law of New York. A bill introduced by Mr. Hill of Buffalo provides that the board of pharmacy be selected by the board of regents of the University of the State of New York from qualified registered pharmacists of the state. The state pharmaceutical association is allowed to nominate to the regents three pharmacists for each appointment to be made. The bill includes adulterating, misbranding and substituting features of a pure drug law, and recognizes the Pharmacopoeia, National Formulary, Homeopathic Pharmacopoeia and other standard works recognized by the Board. A bill has also been introduced making it unlawful for any corporation to practice medicine, dentistry or pharmacy. The idea is to legislate against the chain-store system. Another bill has been introduced in the legislature restricting the sale of cocaine in the city of New York.

North Carolina. North Carolina has a new itinerant-vendors law.

Ohio. Ohio has new laws regulating itinerant vendors and adding certain narcotics to the cocaine law.

Rhode Island. An amendment to the pharmacy law defines a practicing pharmacist, practicing assistant, and regulates the method of becoming registered.

South Carolina. South Carolina has a bill before its legislature to compel applicants for registration to pass examination.

Tennessee. Bills failed to pass providing registration for all who have been in business six years, and to give registration to all assistants of five years' standing without further examination.

Washington. The state board of pharmacy now has the power to prescribe the educational qualifications of candidates for examination and to revoke licenses.

ASSOCIATIONS.

It was aptly stated last year in the Secretary's report that the burden of proper legislative enactment in the various states rests with the state associations. A glance at the percentage of druggists who hold membership in these associations indicates that this burden in a majority of states is carried by a very few. Most of the states report that only 10 to 25 per cent. of the druggists hold membership in the state association. A few notable exceptions should be mentioned. Vermont leads with 93 per cent.; Kentucky follows with 75 per cent.; South Carolina next with 66 $\frac{2}{3}$ per cent., while some four or five states report a membership of 30 to 60 per cent. Arizona, Nevada and New Mexico report no association.

If, as has been stated, legislation in the states rests with the association, greater efforts should be made to have a larger percentage of active members in these associations. Last year our schools of pharmacy graduated about 1,500 students and they report that an average of 80 per cent. of their graduates enter the practice of pharmacy. Here is an opportunity for the schools to do a work having far-reaching results. Let every school see to it that its graduates affiliate with their state association.

SCHOOLS.

Fifty-six schools of pharmacy replied to the request for information concerning their curriculum. The following subjects are listed by the various schools as belonging to the first year's work: General chemistry, qualitative analysis, physiology, pharmacy, pharmacognosy, English, botany, microscopy, materia medica, physics, plant histology, Latin, arithmetic, anatomy, pharmaceutical testing, United States Pharmacopœia, toxicology, quantitative analysis, business methods, bacteriology and biology—a total of 22 subjects.

In the second year's work we find the following subjects listed; Pharmacy, prescriptions, organic chemistry, quantitative analysis, bacteriology, pharmacology, toxicology, microscopy, materia medica, commercial pharmacognosy, therapeutics, urinalysis, food and drug analysis, jurisprudence, mercantile pharmacy, physiology, mathematics, histology, dispensing, problems, pharmaceutical economics, accounting, pharmacopœias of the world, drug assaying, sanitary analysis, commercial microscopy, qualitative analysis, physics, United States Pharmacopœia, water analysis, physiological chemistry, diseases, hygiene and sanitation, national formulary, crystallography, first aids, mineralogy, field botany and pharmacognosy—a total of 39 different subjects or 39 different names for studies. Cutting out duplications we have a total of 48 different subjects for the two years' work.

Are the various schools of pharmacy graduating men without uniform training, or do we lack a uniform nomenclature for the studies required of the pharmacy student? I am inclined to believe that we can answer both questions in the affirmative. Is it any wonder that one state board when asked, "What recognition do you give to graduates of schools of pharmacy," answered "None, because we find so many graduates who cannot pass our examination." This state board may have been requiring knowledge of some half-dozen subjects when the graduates had been trained in subjects selected from the other forty. Is it not time for the various schools to get together on the question of cur-

riculum and adopt something, subject matter as well as subject name, which the graduate should be expected to know? Should not the schools of pharmacy as well as state boards be urged to give the Pharmaceutical Syllabus recently issued a little more than a casual glance? No school might be able to follow in every detail the work as there outlined, but if the syllabus were taken as a basis upon which to build, the curriculum would be much simplified.

In this matter of curriculum I dislike to admit that we are behind other professional schools, and even liberal arts colleges, where much more plasticity could be allowed than in professional schools. I claim that our course of study, being shorter and having more of the nature of an applied science, by just so much are we in greater need of a uniform curriculum than the liberal arts college. To the broadly educated man of so-called cultural attainments, who may be a writer, a lecturer, a minister or a critic of art, it is not of so much import whether he continue Greek or take up biology in his second year, but to the pharmacist, whose second year is probably his last, and whose course of study while not supposed to culminate in the State Board examination must nevertheless attain to that, it is of vital importance whether he spend several hours upon the study of anatomy or prescriptions.

If some kind genie were to grant me leave to express a hope through the fulfilment of which in the coming year my greatest desire for the good of the colleges of pharmacy might be accomplished, I should say, "Place in all of our schools a sound and uniform course of study." If by some good fortune I were allowed a second wish, it would be, "Band together for mutual protection and common achievement *all* pharmacists in *every* State." If the wand were waved a third time, I should say, "Implant in the soul of every pharmacist a righteous desire to put into his profession the highest and best of himself, making it not alone a means of money-getting, but a true embodiment of his earnest purposes, part and parcel of himself. Let him be of this or that or the other faith or sect or cult, but let him regard his profession as his masterpiece, the truest reflection of himself that he can present to the world."

Respectfully,

CHARLES W. JOHNSON,
*Secretary of Section on Education and Legislation,
American Pharmaceutical Association.*

Richmond, Va., May, 1910.

The Chair called for action upon this very able and comprehensive report, and on motion of Mr. Asher, seconded by Mr. Sayre, it was ordered received and referred for publication.

The Chair stated that the next thing on the program was a paper by Doctor Harvey W. Wiley, of Washington, on the subject of "Drug Legislation as an Educator," but unfortunately the author was not able to be present, though he had sent his paper, and he suggested that the paper be read by title and referred to the Publication Committee. On motion of Mr. Asher, seconded by Mr. Stewart, it was so ordered. The full text of said paper here follows:

DRUG LEGISLATION AS AN EDUCATOR.

H. W. WILEY, M. D.

In discussing the benefits of the control of drugs, thus securing greater purity and efficiency in their use and eliminating fraud and deception from commerce therein, little attention has been paid to another important feature of such legislation.

It is quite evident that a very marked effect has been produced by this legislation in the way of education. In the curricula of the pharmaceutical colleges as a result of such legislation, attention has been directed more particularly to instruction which will enable those who manufacture and deal in drugs to conform to the provisions of the Food and Drugs Act.

This instruction has taken two principal forms :

First, a more rigid chemical control of the raw materials as well as of the finished product ; and *second*, a great extension of the use of the microscope as a means of detecting adulteration and debasement.

In at least one pharmaceutical school which has come under my notice the full time of one professor is devoted to microscopical instruction where before the enactment of the law such instruction was a mere incident to the course. It is evident that in this one line a tremendous impetus has been given in an educational way to the training of experts in higher grades and efficiency, not particularly for use in national and state service, but for practical use in the factory and in the pharmacy. The value of this improvement, or extension rather, of education has not been fully appreciated, and it will be several years before the full impress of this new education is felt in a practical way. It is evident, I think, that this impress will be reflected in a much higher grade of raw materials, both of those produced in this country and of those imported from foreign countries. In fact, this result has already been secured in a very marked degree, and the character of the imported crude drugs especially has been vastly improved under this, what may be called, enforced instruction.

These changes in a practical way in the drug trade are so evident that they need no further exposition. The incidental or collateral effects of improved education are, however, deserving of a word. This educational work has been carried on largely in the trade journals devoted to pharmacy. There is scarcely an issue of these trade journals which does not have something bearing upon this point. Particular attention is called to some low-grade drug, or one which falls short of perfection, as a warning to those engaged in the trade, or better still, scarcely an issue of any of these journals appears without some article of research, indicating further extension of our knowledge respecting the character of drugs or some improvement in their handling.

Attention has been continually called to the fact that refuse matter, sand, dirt, sticks, and other extraneous bodies, have no place even in the crude drugs of commerce, and the importance of this fact has gradually dawned on the trade and on the people. It does not pay to transport dirt and refuse matter and the education incident to the drug legislation has brought this fact prominently to the fore. It may be all right to use refuse matter at home where its character is well known, and where it can be administered in such a way as to avoid any injury, but when it comes

to transportation of a material, no matter what it is, the extending knowledge of the subject has shown that only good materials really pay for transportation. Again, through this same avenue, namely, the trade press, not only are the pharmacists throughout the country receiving a post-graduate course of practical value, but the reading of pharmaceutical trade papers is extending both to other professional men not actively engaged in the drug trade, and also to the laity. In other words, pharmaceutical journals are not read alone by pharmacists but often contain matters of intense public interest, largely due to the awakened conscience of the trade as a result of knowledge brought about directly, or indirectly, through drug legislation. This knowledge does not extend merely to composition and quality, but also to effect and use. It can do no possible harm to the pharmaceutical trade to have a wider knowledge of the character of drugs disseminated among the people; hence it is not unusual to see the daily journals contain articles on drugs, their methods of preparation, their places of growth, means of transportation, and results of administration. Thus to the people at large a very considerable knowledge of drugs and their uses is imparted as a result of the legislation and the enforcement of the law.

The publication of notices of judgment of cases tried in the United States courts is very wide. Many of these notices of judgment find their way not only into pharmaceutical papers, but into other trade journals and into the daily papers. It is remarkable how many newspapers, magazines and trade journals publish these notices. Every one of them is an education to the person reading it, and thus a very extensive education of the people has resulted as incidental to the enforcement of the legislation controlling commerce in drugs.

The above are merely outlines of the various methods of education which have been either energized or established by drug legislation. At this time in almost all the states drug and food legislation are going hand in hand, and there are numerous centers of activity of an educational character emanating not alone from the national government but from the various state governments. All of these centers of activity impart instruction, all command the attention of the public, and everywhere interest in their work is manifested. The same thing is happening in the drug trade that has already happened in agriculture. A quarter of a century ago the farmers' institute was a rather remarkable affair as compared with the farmers' institute of to-day. Either the speakers were not masters in any scientific way of their themes, or if they were, the people were wholly incapable of understanding what they said. At the present day it requires an expert, not only of wide knowledge but of accurate knowledge, to go before a farmers' institute and make an address. If he should make the least slip in his scientific statements there are dozens of farmers who would instantly recognize the error. The day is approaching when an expert in

the drug line can go before a public audience and speak on scientific matters connected with the drug trade and be fully understood and comprehended by the people he is addressing. It is thus seen that from many points of view drug legislation has resulted, not only in an extensive, but a most valuable education of the people.

The Chair here offered an opportunity to Mr. Remington, of Philadelphia, to present a paper on Synonyms, which he had prepared.

Mr. Remington said before he read this short paper he wanted to say that, while he had been a member of this Section, and a member of the Association, for many years, the papers read by the Chairman and Secretary were the best he had ever heard in any Section on their respective subjects, and he was only sorry that a larger number of members of the Association could not have been present to hear them.

Mr. Remington then proceeded to the presentation of his paper, stating that it was short, and intended to emphasize the subject of synonyms, which would come up next week in the Pharmacopœial Convention, and would occasion a good deal of solid thought :

SYNONYMS.

BY JOSEPH P. REMINGTON, PH. M.

For forty years the Committee of Revision of the United States Pharmacopœia have steadily pursued the policy of discouraging the use of synonyms, and every decade a number of them were dropped. Notwithstanding this, however, synonyms have been kept alive by wholesale and retail druggists, manufacturers, and others who have not been in sympathy with the efforts of the Revision Committee, and hence there has been very little change in labels. But there is another reason which lies deeper. The people have become so accustomed to these synonyms which are in constant use that, no matter what efforts are made by authorities, the names laudanum, paregoric, Brown's mixture, cathartic pills, etc., etc., will probably always be used.

One can easily picture the consternation of a customer calling for paregoric and receiving a liquid in a bottle labeled, *tinctura opii camphorata*. No amount of explanation would probably thoroughly satisfy the anxious mother that she was not poisoning her darling boy.

Is it not time to recognize the real facts and, at the present time, a serious condition confronts us. The Food and Drugs Act requires that the labels of official articles shall conform to the Pharmacopœia tests for that article, but if a synonym does not appear in the Pharmacopœia, then there is a loop-hole to escape prosecution. Hyoscyamus would have to comply with the requirements of the official assay, but henbane can go scotfree.

There seems to be no other way to secure a rigid enforcement of the

law than to introduce the synonyms, in some form, into the next Pharmacopœia. It would probably be better to insert these in a table in the appendix, and then in the Introductory Notices, in the Pharmacopœia, state that the same requirements and tests apply to the articles known as synonyms as to the articles described under the Latin titles or English names in the text of the book but, even if this is done, there is a loop-hole. Many of the crude drugs have half a dozen or more synonyms and, with a little ingenuity, the dishonest dealer can select some synonym which is obscure and not covered in the pharmacopœial table.

This need not, however, prevent the introduction of synonyms in the least objectionable way in the Pharmacopœia, and it would serve to correct, in a material way, the abuse of synonyms.

The Chair invited discussion upon the paper just read.

Mr. Rusby said the question was one of great importance. Twenty years ago, when it was proposed to drop synonyms from Pharmacopœia, he had opposed it strenuously, but was defeated; and the last time when it was proposed to reinsert it he was very urgently in favor of it, but not in favor of putting them in the back part of the book, as was now proposed. He believed they should come in connection with the title, where the article was discussed; that it should be in connection with the main title, as in the Dispensatories. He thought the influence of the law, which made it necessary to put synonyms in the Pharmacopœia now, was proof that the necessity existed just as much before, for the safety of professional work. He thought the prospect of having more synonyms in the Pharmacopœia was a cause for congratulation.

Mr. Remington said he was glad to hear Mr. Rusby's views on this question, but in regard to crude drugs there were two ways of looking at the definition of "synonym:" one, that it was the equivalent of the article defined in the text, the other that it was a *near*-drug, or a *near*-preparation. He thought if the Pharmacopœia insisted on synonyms, they should be an equivalent synonym—an exact equivalent, and regarded as equivalent; otherwise, the door would be open to a lot of things which could not, in law, be regarded as equivalent.

Speaking further on this question, Mr. Rusby said that it was the business of the Pharmacopœial Committee to study this subject, and then put these synonyms in the Pharmacopœia as they thought they ought to go. He said he had been surprised at the number of drugs imported through the port of New York and sold under names that were not to be found in the Pharmacopœia or Dispensatories. This very state of things made it a matter of urgent necessity that the Pharmacopœial Revision Committee should take up the subject of synonyms, study them, and state under what synonyms drugs should be recognized, and fix it once for all.

Mr. Remington said this was just the information he wanted; that he

knew Mr. Rusby had that knowledge and experience, and he wanted to draw it out, so as to put in on record.

Mr. Asher, seconded by Mr. Sayre, moved to refer this paper to the Committee on U. S. Pharmacopœial Revision.

The Chair stated that the motion was, that this paper be referred to the Committee on U. S. Pharmacopœia, which had already reported to the Scientific Section, the results of this paper to be embodied with their recommendations.

And so the motion was put and carried.

The Chair stated he wished to interpolate in the program here something he had in mind at the time the program was issued, and then allow a few minutes' discussion of the subject, limiting it to not more than ten minutes, in order that the time for presentation of papers might not be too much encroached upon. The question of Pharmaceutical Syllabus was the subject he referred to, and he said Mr. Rusby had kindly consented to present it before the Section.

Mr. Rusby said this was not the time to discuss the Pharmaceutical Syllabus, because that was set down for discussion to-morrow at a joint session with the Boards of Pharmacy and the Conference of Pharmaceutical Faculties. His purpose here was simply to present the matter before this Section, which was one of the three bodies which had to do with the adoption of the Syllabus, and the completion of it. He said it was a very great pleasure for him to present this subject before the Section on Education. He would not go into the history of the matter, involving the action of the three bodies concerned in its production, and the generosity of the New York Board of Pharmacy in voluntarily surrendering to the Committee of Twenty-One its position of leadership in this movement. The three bodies to whom it was now committed were the American Pharmaceutical Association, through its Section on Education and Legislation; the National Association of Boards of Pharmacy, and the American Conference of Pharmaceutical Faculties. Each of these bodies was to be represented by seven members on the Syllabus Committee, which would be known as the Committee of Twenty-One on Pharmaceutical Syllabus. Seven members had been appointed the night before by the Conference of Faculties, and seven more this morning would be appointed by the Association of Boards of Pharmacy; and then, at the noon session of the American Pharmaceutical Association in this room, the seven members of the committee from this body would be appointed.

Continuing, Mr. Rusby said he wanted especially to speak of the educational value of this Syllabus to the people who had made it. He had been singularly interested in this question, but his interest from the beginning had been more in the direction of the educational work the Syllabus would do among the members of Boards of Pharmacy and the Faculties than among the students. The right view of a subject was not always had at

first. Twenty years ago, he said, he went to the Pharmacopœial Convention at Washington and urged that the Pharmacopœia should recognize pharmaceutical assaying. At that time he was in a hopeless minority, but he did not believe there would be three people in the convention to-day who would favor giving up pharmaceutical assaying. At the last meeting of the Pharmacopœial Convention an attempt to have the Pharmacopœia say something about powdered drugs was voted down. Physiological assay was another subject. All these things must have a start, and when they start they have very few advocates.

Mr. Rusby said that there was a general feeling that the time allowed for physiology in the Syllabus was too great. His view was that it was not too great, but that the percentage was too great—the percentage of time allowed for physiology was out of proportion, that he would admit. But there was nothing in the Syllabus on the subject of physiology that was not absolutely essential to a proper understanding of the subject; and no student could study *materia medica* as taught by the colleges, and understand it, if he knew less physiology than was provided here. The trouble was, that, though the percentage might be too great, the total course was not enough.

Mr. Rusby said that there were subjects in the Syllabus that had never been dreamt of, and spoke of the general movement among the Faculties and Boards of Pharmacy in getting ready to use the Syllabus. He cited the case of physics and other studies to illustrate the range of the Syllabus in this respect. He also spoke of the microscopic examination of powdered drugs—the way in which the druggist gets nineteen-twentieths of drugs—and the fact that, whereas the custom had been to have one microscope do for a number of students, now a microscope was to be provided for each student.

He referred to the presence of politics in Boards of Pharmacy, and the many members who had been upon such Boards as the result of political influence, and who were not qualified for their work. He said that in the effort to conform to the requirements of the Syllabus some of the members would master it, and others would say, "It is no use; I am too old." Some would go on and others would drop out.

Referring to the claim that in certain foreign countries American pharmacists were but poorly regarded, Mr. Rusby asked the question why this was, and gave the answer that it was because the American pharmacists as a class were not the educated men they should be—that they had not the education of their class in other countries.

Mr. Rusby went on to say that he did not believe there had been as much progress made in any line of education in the history of the world as there has been made in the history of Pharmacy in the last ten years. It was simply marvelous. He said he happened to know personally a number of professors in colleges of pharmacy and the schools who were

now buying text books on physiology, so they would be prepared to meet the requirements of the Syllabus in this respect.

Referring to the statement made by Mr. Beal at the Conference of Faculties the night before, to the effect that this was only a tentative Syllabus, Mr. Rusby said that all recognized that there must be changes in it; that nobody approved of it as a whole, but it was common ground upon which all could come together for the time being. The idea was to try it out for five years, and then make desired changes.

Mr. Rusby concluded by saying that he would like to have a motion by some one that the general principles of the Syllabus be approved.

Thereupon, Mr. Sayre, seconded by Mr. Stewart, moved that the Section on Education and Legislation approve the general plan of Syllabus presented by the Committee of Twenty-one, and also the appointment of a committee of this Association to co-operate with the committee having general charge of its revision.

Carried.

The Chair said the next subject on the program was a paper on the Need of a Federal Poison Law, by L. F. Kebler.

Mr. Kebler read the following :

THE NEED OF A FEDERAL POISON LAW.

BY L. F. KEBLER,
Chief, Drug Division.

There are at present fifty-three separate and distinct law-making jurisdictions exclusive of municipalities, etc., within the United States, and it can readily be seen that if each jurisdiction makes laws differing materially from those enacted and enforced in other jurisdictions manufacturers and dealers will be much hampered and annoyed.

During the last few years I have frequently been asked questions in substance as follows : " Why is there not an effort made to have a federal poison law enacted so as to bring about uniformity in poison labels throughout the United States ? " After listening to the arguments of these manufacturers and dealers I looked into the question and found conditions which would certainly not make for facility in trade.

For example, the Massachusetts law requires the word " poison " to be printed in large black letters upon red paper.

The same law prevails in the Philippine Islands.

The labels in general use for poisons in Florida, Georgia and Mississippi, are red upon white or white upon red, but morphine and the salts of same are required to be labeled on *scarlet* paper.

The law of California requires the label to be printed either red upon white paper or white upon red paper, and in addition prescribes that an antidote shall be adopted by the Board of Pharmacy, and such antidote and no other shall be the one indicated upon the label.

This is sufficient to indicate the present situation relative to poison labels from the manufacturer's or dealer's point of view.

Another point prominently brought forward is the fact that nearly all jurisdictions have some law requiring poisons and preparations containing same to bear a poison label. In many instances, however, the retailer is constantly violating the law, for the simple reason that he has no way of knowing and is not advised relative to the poisonous nature of certain commodities sent into interstate commerce.

I recently examined a preparation containing almost as much arsenic as Fowler's Solution, and in addition thereto the maximum amount of opium salable in the District of Columbia and other jurisdictions, yet there was nothing upon the label or the package to indicate that the product was poisonous in nature except the declaration of two grains of opium to the fluidounce, a quantity which is not in excess of the amount permitted to be sold without restriction or a poison label. From conditions obtaining at present the retailer has no intimation whatever relative to the presence of any arsenic in this preparation, and he is unknowingly induced to violate the local law almost daily. This is only an example.

Many poisonous mixtures are sent directly from the manufacturer to the consumer without warning the latter in any manner whatever relative to the poisonous nature and dangerous character of the compound. For example, it is not uncommon to send to the consumer direct lozenges, sugar-coated pills, tablets, etc., containing larger or smaller doses of strychnine, arsenic, corrosive sublimate, etc., without indicating in any way to the consumer the fact that the said products are poisonous in any degree, with the result that proper care is often not exercised to protect others. The packages are not removed from the reach of children, who, obtaining possession of same, believe them to be candy, with the result that a life is lost. This is not a theoretical deduction, but an observed fact. There recently was brought to my attention a so-called asthma remedy sent directly into the home by a lumber dealer, who had acquired the prescription containing enough chloral hydrate in an ounce of the material to take the lives of two or more adult persons or the lives of half a dozen of children, and yet nothing appeared upon the label to indicate in any manner the poisonous or dangerous character of the contents of the bottle.

Another line of business is the sending of large quantities of poisonous and habit-forming agents by the so-called drug-addiction "treaters" directly to supposed habitues through express companies. There are at present about 30 of these institutions and in some instances their remedies contain large quantities of morphine sulphate, opium, chloral hydrate and smaller amounts of cannabis indica, heroin, codeine, cocaine, etc. One physician supplied a treatment to a supposed morphine addict which contained, according to his own statement, 22 grains of morphine to the fluid ounce. Another so-called "doctor," a reverend gentleman, supplied a

mixture containing on the average 14.2 grains of morphine sulphate to the ounce. In one system in vogue a series of bottles are used, for example, 10, 12 or 18, as the case may be. These bottles usually contain large quantities of morphine sulphate, opium, dionin, heroin, etc. In one instance, for example, each of the 10 bottles contains $2\frac{2}{3}$ grains of dionin and 4 grains of morphine sulphate per fluid ounce. Each bottle holds about 4 ounces of fluid, which means that each package contains approximately 16 grains of morphine sulphate and about 10 grains of dionin. These bottles are all marked "first supply." In another instance 18 bottles are used, nearly all of which contain large amounts of morphine sulphate. In some cases the amount of morphine sulphate is so large that it is impossible to bring about a complete solution by the vehicle employed. A "shake label" is wanting. Unless great care is exercised in a case of this character by the patient consuming the mixture, he is liable to take the greater portion of the undissolved morphine sulphate in the last dose and may thus unwittingly terminate his life. I am led to the belief that this is not such a very rare outcome with mixtures of this character, and, as a rule, no one is left to tell of the conditions surrounding the death. In none of the cases set forth above is there any indication whatever relative to the poisonous nature of the contents of the various bottles.

An interesting but sad feature brought out during my investigation is the fact that the demands for these poisonous habit-forming agents is much greater in the states having stringent laws which are being enforced. This feature has been brought to my attention particularly in connection with the so-called drug-addiction treatments, the states mentioned most commonly being Virginia, Texas and California.

It is true there is some feeling to the effect that too promiscuous a use of the poison label is liable to make it so common as to be ignored by the consumer. There may be some basis for this contention but in my opinion this is a trivial feature compared with the situation set forth above. The red light is commonly and prominently displayed where known danger exists. It is true these danger signals are at times disregarded with disastrous results, but is this any argument to the effect that these harbingers of safety should be removed because they are so commonly used? I think this is poor logic. Give the public the benefit of the doubt at least. The question naturally arising is what would be a suitable law? There are at present a number of excellent state laws which could be used as models; for example, Virginia, Texas, California, the District of Columbia, etc.

The Chair called for action upon this very excellent paper, and said that no one was better qualified to express an opinion on this particular subject than Mr. Kebler, as he knew the conditions as they existed.

Mr. Cliffe, seconded by Mr. Remington moved to receive and refer to the Publication Committee.

Mr. Asher asked Mr. Kebler whether the Federal law or rule required a poison label on substances containing poison, and Mr. Kebler replied in the negative. Thereupon Mr. Asher suggested it would be wise for the Association to go on record as requesting a change of the law, so that a poison label would be required.

The Chair responding to this, said he thought it would be a wise action for the Section to take, and suggested that Mr. Asher draw up such a resolution and present it at the afternoon session.

Thereupon the motion to receive and refer the paper for publication was carried.

The Chair called for a paper by Mr. Hallberg, on the Federal Food and Drugs Act, and Mr. Hallberg presented his subject in extended verbal extract, the full text of his paper being as follows :

THE FEDERAL FOOD AND DRUGS ACT.

THE PRINCIPLE INVOLVED AND THE RELATION THERETO OF STATE LEGISLATION.

BY C. S. N. HALLBERG.

The Federal Food and Drugs Act has now been in force nearly four years.

Despite the fact that it is purely an interstate measure it has done much good and could have been of much greater benefit but for the unfamiliarity on the part of both legislators and laymen as to the distinction between limitations and functions of, Acts by the Congress and legislation by the States.

Here it is possible that the exemption provision as to drug standards in the Federal Act may be unobjectionable and that it was necessary in order to avoid any serious restriction on trade and industry. On the other hand it was exceedingly unfortunate that so many States should copy this exemption provision in the State Acts. The exemption was evidently the result of a compromise with the interests who insisted on being protected or they would defeat the passage of the Act. Others again are certain that the law is unconstitutional and that it will be so declared by the U. S. Supreme Court. In this connection it may be interesting to examine into how such a law comes within the scope of the Constitution of the U. S., so as to be subject to Act by the Congress.

The Constitution of the U. S. is not a complete scheme of government for the people of the United States but only a part and that only the smaller part of such a scheme. To fill out the outline the constitutions and the laws of the several states must be taken into account. These provide by far the greater part of the machinery of government, the security of life, liberty and property and the political rights of the citizens.

"We the people of the U. S. in order to form a more perfect union, establish justice and insure domestic tranquillity, provide for the common defence, *promote the general welfare* and to secure the blessings of liberty to ourselves and our posterity, do ordain and establish this constitution for the United States of America."

SEC. 8. Congress shall have power to lay and collect taxes, duties, imposts and excises, to pay debts and provide for the common defense and *general welfare* of the U. S. to *regulate* commerce with foreign nations and among the several states and with the Indian Tribes.

Amendments: Art. X. The powers not delegated to the U. S. by the constitution nor prohibited by it to the States, are reserved to the states respectively or to the people.

It is then under the broad principle of "to promote the general welfare" that the Congress received its power to legislate on such objects, as Food and Drugs, and utilizes its further power "to regulate commerce between foreign countries and the individual states," as a means to that end.

Is there anything that concerns or promotes the general welfare any more than supervision of the quality of Food and Drugs and protection of the public against adulterations and fraud?

But in order to conform with the most literal construction of the Constitution the Act by Congress is limited to interstate commerce and does not propose to interfere with intra-state trade.

This is in accord with the genius of our form of government—the most vital and valuable principle—that each state for itself experiment in this kind of legislation so that through generous rivalry, the most perfect forms of law known to man may be the result for this great democratic republic.

Alas! It may be only a theory, but nevertheless this is the guiding principle as enunciated by Jefferson and the fathers of the republic. The responsibility is upon us through our respective legislatures to work out such problems. There is no other way since the powers of the Congress are limited to those few functions delegated to it by the States.

EXTRACTS FROM THE FOOD AND DRUGS ACT.

The following sections of the Act as applied to drugs require study:

SEC. VI. That the term "drug" as used in this Act, shall include all medicines and preparations recognized in the United States Pharmacopœia or National Formulary for internal or external use, and any substance or mixture of substances intended to be used for the cure, mitigation, or prevention of disease of either man or other animals. The term "food," as used herein, shall include all articles used for food, drink, confectionery, or condiment by man or other animals, whether simple, mixed or compound.

SEC. VII. That for the purposes of this Act an article shall be deemed to be adulterated:

In case of drugs:

First. If, when a drug is sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as determined by the test laid down in the United States Pharmacopœia or National Formulary official at the time of investigation:

Provided. That no drug defined in the United States Pharmacopœia or National Formulary shall be deemed to be adulterated under this provision if the standard of strength, quality or purity be plainly stated upon the bottle, box or other container thereof, although the standard may differ from that determined by the test laid down in the United States Pharmacopœia or National Formulary.

SEC. VIII. That the term "misbranded," as used herein, shall apply to all drugs or articles of food, or articles which enter into the composition of food, the package or label of which shall bear any statement, design or device regarding such article, or the ingredients or substances contained therein which shall be false or misleading in any particular, and to any food or drug product which is falsely branded as to the State, Territory or country in which it is manufactured or produced.

Second. If the contents of the package as originally put up shall have been removed, in whole or in part, and other contents shall have been placed in such package, or if the package fail to bear a statement on the label of the quantity or proportion of any alcohol, morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate, or acetanilide, or any derivative or preparation of any such substances contained therein :

REGULATION 7. STANDARDS FOR DRUGS. (SECTION 7.)

(a) A drug bearing a name recognized in the United States Pharmacopœia or National Formulary, without any further statement respecting its character, shall be required to conform in strength, quality and purity to the standards prescribed or indicated for a drug of the same name recognized in the United States Pharmacopœia or National Formulary, official at the time.

(b) A drug bearing a name recognized in the United States Pharmacopœia or National Formulary, and branded to show a different standard of strength, quality or purity, shall *not* be regarded as adulterated if it conforms to its declared standard.

It will be observed that the provision leaving the standards of the U. S. P. and N. F. optional, places the responsibility of protecting these with the individual states and supplementary to the Federal Act each State Legislature should enact a law, where such is not already in force, requiring that when a drug is sold under the name or title of the U. S. P. it must conform to the requirements of identity, strength, purity and quality ; not to declare for such standards, only to permit their debasement through exemption.

Yet more than twenty states have enacted drug laws with this exemption, thus vitiating the good accomplished during all the years that the adulterations section in the Pharmacy Law have been in operation. This declared it unlawful to sell any article under the name official in the U. S. P. if below the standard of strength, etc., therein contained. This principle is as old as the Pharmacopœias themselves. It led to the adoption of the Pharmacopœias as against the private dispensaries.

The practical results are that all that the manufacturers or wholesale druggist has to do in order to comply with the law is to affix to the label of the package of the drug the injunction "For technical purposes," "For Mechanical Use," "Commercial," etc. Thus in Chicago, where no drugs act is in force, the section of the Pharmacy Act not having been enforced for some years, the common chemicals, drugs and essential oils are labeled so as to conform with the Federal Act, as for example :

Sulphur—for technical purposes.

Muriate ammonia—for technical purposes.

Carbonate magnesia—for technical purposes.

Oil of rose—for technical purposes.

Magnesium sulphate—for technical purposes.

Calcium carbonate—technical.

Oil almonds—imitation.

The only reason for the existence of Food and Drugs Laws are that they are a protection to the public. In what manner is a law a protection to the public which permits the manufacturer or wholesale dealer to sell any kind of adulterated article—Epsom salts—for example, containing 30 per cent. of impurities of calcium chloride, etc., by simply attaching to the label the legend “for technical purposes.” The only technical purpose for magnesium sulphate is in the making of such preparations as “blush of roses” for decorative facial effects.

Besides, the retail dealer does not affix this injunction on the label, and the buyer is not any wiser, but believes that if it bears the notorious guarantee legend, that it is a pure and safe medicine.

What a travesty on honest dealing; what a dastardly attempt to hood-wink the public, and what an act of vandalism on the dearest and highest prerogatives of pharmacy and its principles which distinguish its votaries as professional men!

The old principle, “caveat emptor,” let the buyer beware, does not apply to drugs; but here the principle, “caveat venditor,” let the seller beware.

The buyer is not responsible in buying drugs, but the seller is, and this is what distinguishes a profession from a trade—the professional man as a pharmacist, selling drugs against the man who is simply engaged in buying and selling and who assumes no responsibility, but places this entirely on his customer or patron while he hides under the “guarantee label.”

Drugs when sold place responsibility on the seller, and he is, therefore, the one responsible for the identity, quality, purity and strength. He cannot shift this on the buyer, and he, therefore, commits a fraud when he knowingly sells a drug which is not of the standard required, since the buyer is not competent for himself to determine its quality.

All State Drugs Acts should therefore carefully avoid falling into the error of exemption of the Federal Act, but they should declare that all drugs sold for medicinal uses under the names recognized in the national standards must show reasonable conformity thereto.

University of Illinois, School of Pharmacy, Chicago, May 1, 1910.

Mr. Remington said he wanted to call attention to what he considered was an exceedingly valuable point that Mr. Hallberg had brought out very clearly, and that was, that the principle of “*caveat emptor*” should

not apply to medicine. In the case of medicines, particularly, the seller should beware what he sells.

On motion of Mr. Remington, Mr. Hallberg's paper was ordered received and referred to the Publication Committee.

The next paper was one by Wilhelm Bodemann, entitled "So-called Attempts to Improve Pharmacy Laws," and Mr. Bodemann presented his subject as follows :

SO-CALLED ATTEMPTS TO IMPROVE PHARMACY LAWS.

WILHELM BODEMANN.

Do not improve your State law, or try to do so, if the improvement makes the law worse than it was. Law-making is a business by itself and requires practice, as much, if not more, than the Art of Pharmacy itself. What you try to attain is one thing, what you get quite another. Let me illustrate this point.

The A. Ph. A. discussed pharmacy law changes in 1906, and wanted the time service clause wiped out, wanted the requirements for R. P. (Registered Pharmacist) increased and for A. P. (Assistant Pharmacist) decreased. What did we get? The time service was retained and the required time of experience reduced from five to four years. The requirement for R. P. was not increased but lowered—so that any candidate with two years' experience and two years' college attendance can on proper examination become full R. P.

I have read the legislative reports of the A. Ph. A. for many years very carefully, and find that American Pharmacy, as represented in the A. Ph. A. has always unanimously insisted on four years' of practical experience, outside of college attendance.

Again in 1908 we talked "change of the law." This time the war cry was "increase of R. P. requirements—and lowering requirements of A. P.—but increase of A. P. privileges." If, as claimed, an A. P. can take charge of a store for three, six, twelve or twenty-four months, then I ask, in all fairness, where does the difference between A. P. and R. P. come in? John Jones, R. P., can open a chain of stores, and after the R. P. has opened the store, let an A. P. run it—if the privileges of an A. P. are to be limitless.

In 1908 we talked "Diploma requisites," and this lured even many of the staunch advocates of the Illinois Apprentice Law to back water and sacrifice this gem of the Illinois law to the popular clamor for college diploma requirements. I do earnestly hope and pray that the time may come when Illinois or all States can put college diploma on their banner of requirements for registration, but because I do want higher education I cannot approve of cutting the very foundation to a higher education away from under this desideratum. If you admit the rabble, the cripple, as our lamented Searby termed the incompetent, to the ranks of Pharmacy, how in the name of common sense and fair play can you insist on

diploma requisite when the very essence of a college diploma is good preliminary education? What prudent contractor would allow a twenty-five-story-high sky-scraper to be built on a cedar post foundation?

When the 1908 our Legislative Committee was instructed to draft a law for diploma requisite, it was found expedient not to bother the Legislature with a change, and, nothing was done. This by way of illustrating my assertion—don't try to improve the law of your State if the improvement makes your law worse.

Right here I desire to state my firm conviction that our laws do not need improvement nearly as badly as laws to improve the Boards enforcing such laws. A poorly enforced law is a farce, and I wish to illustrate this point also. The Illinois law provides for recommendation by the I. Ph. A. to the Governor for Board appointments. These recommendations are optional, gratuitous, but the law says "*The Governor shall appoint.*" But the Governor does not do so; he puts the aforesaid recommendations into cold storage for two and three years, for political expediency, and when he gets busy, as he has done, pays no attention to aforesaid recommendations, and makes political appointments to please political ward heelers, and appoints men with commercial side lines.

I can imagine no greater injury to pharmacy in my State than political Boards, and law enforced by men with side lines. At present there is a great wave of centralization going through this land. I hope that the A. Ph. A. will "catch on" and boost the cry for a National Board of Health, and if you please, a National Board of Pharmacy. We have all read what the Committee on Medical Colleges reported—over 50 per cent. of the job lot worthless. The demand was fewer but better colleges of medicine, and I emphatically insist that this applies to schools and boards of pharmacy.

A National Board of Pharmacy would do away with the bane of the National Conference of Boards of Pharmacy, viz., exchange of certificates—it would at once elevate pharmacy by abolishment of political hack drivers acting as State Board members, discrediting enforcement of pharmacy laws by political consideration and commercial influences. The position of board member should be a position of honor, not darkened by lobbyists and actors. Dr. Edmund James of the great Illinois University, hauled so august a person as Supreme Court Justice Harlan over the coals, in Marquis of Queensbury style—for what? For appearing as a lobbyist in favor of a college from which he received a salary. A Supreme Court judge with a side line! This shows that we are living in a commercial age, and I earnestly beseech this great A. Ph. A., that you will do all in your power to centralize the governing authority of pharmacy boards. Politics are the curse of this country, and woe to pharmacy if the time ever comes when our States are in the clutches of that dragon, politics.

Gentlemen, if I had had more time, I would have been briefer, for the best of pleas or the best of orations is spoiled by longitude. Long speeches are generally long on words and short on ideas, and again I regret that I could not spend the time to be briefer, for I hope that I may not have preached in vain, like the prophet in the desert.

On motion of Mr. Hallberg, this paper was received and referred to the Publication Committee.

The Chair said the next paper on the program was one by Mr. Sayre, on the "Kansas Liquor Laws as they Affected Medicine and Pharmacy," and called on that gentleman to present his paper.

Mr. Sayre suggested that the paper be read by title only, and it was so ordered.

The full text of his paper here follows :

KANSAS LIQUOR LAWS AS THEY AFFECT MEDICINE AND PHARMACY.

L. E. SAYRE.

Discussion of the liquor laws of an individual state may seem to be too sectional to occupy the attention of a national body, such as this Association. Yet investigation of the efficiency of particular laws in certain localities is one of the surest methods of arriving at positive conclusions regarding the efficiency of different kinds of laws.

Kansas has for years been a much discussed example of a state with prohibitory laws. Criticism of the laws, favorable and adverse, has been made with various degrees of truthfulness and by persons with various degrees of familiarity with their execution.

This brief discussion of the laws, in their relation to druggists, is based on material from the office of the Attorney-General of Kansas, collected by the Assistant Attorney-General, Mr. John Marshall.

Kansas enacted her first prohibitory law in 1881. This law provided for the sale of intoxicating liquors by any druggist who might obtain a permit from the probate judge of his county to sell such intoxicating liquors for medical, mechanical and scientific purposes, upon the written or printed prescription of a practicing physician, who was regularly engaged in the practice of his profession as a business.

Under this law a large number of drug-stores having permits made arrangements with physicians by which thirsty individuals obtained the necessary prescriptions. This abuse of the law, especially by physicians, was very prevalent. A number of physicians throughout the state were prosecuted under this law for giving prescriptions when they had reason to believe that the person asking for the liquor did not need it for legitimate purposes, but desired to use it as a beverage.

In 1885 this law was repealed and another law enacted in its stead. The latter which, during the time in which it was enforced, bringing the

druggists of this state into such disrepute, has been known as the Druggists' Permit Law. It was amended somewhat in 1887, and again in 1903. Under this law a person who desired to obtain an intoxicating liquor for medical, mechanical or scientific purposes, signed and swore to an application for such liquor, and then procured the liquor from a druggist having a permit.

This law, also, was abused, but to a less extent than was the one giving druggists the power to sell upon the prescription of a physician. Under the law enacted in 1885 many persons who desired intoxicants for use as a beverage would sign applications, stating that they desired it for medical purposes, naming any disease which their imagination suggested. Colds and la grippe became amazingly prevalent. In many instances no oath was administered to the applicant. A number of drug-stores in the state were conducted for the primary purpose of selling intoxicants, the sale of drugs for medical use being a secondary consideration. The result was that any person who desired liquor for use as a beverage could obtain it from unscrupulous druggists. Although during the twenty years that this law was upon our statute books, a number of druggists were prosecuted and placed in jail, the great majority of the unscrupulous ones easily avoided legal interference.

On account of the general failure to prosecute and convict druggists who violated the law of 1885, that of 1909 was enacted. This law prohibits the sale of intoxicating liquors for any purpose whatever. There is no defense for a druggist who sells such liquor. If he sells, he violates the law; the result is that he does not sell.

Since the enactment of the present law, practically all drug-stores have gone out of business which were run under the old law, for the purpose of selling liquor for use as a beverage. The present law is probably better observed than any other ever enacted by the legislature for the restriction of the sale of intoxicants. There have been few prosecutions under the law of 1909, because they have been unnecessary. Those which have occurred have been, as a rule, successful.

This absolute prohibition of the sale of liquor for any purpose has been favorably received by the people of Kansas. There has been little criticism of it. Both physicians and druggists agree that it is operating with comparative success, and no hardships worked by the law have come to the attention of the prosecuting officers of the state.

In conclusion, it might be added that the present law causes considerable inconvenience in obtaining alcohol for scientific purposes, since it must be procured from outside the state. Most professional men affected, are magnanimous enough, however, to suffer such inconvenience for the sake of the good name of their profession.

The Chair stated that there was one item of business upon the morning's program which must be transacted before adjournment, and that was

the consideration of the report of the Committee on National and State Legislation referred to this Section at the second general session.* He said there were some recommendations in the report which he would ask Chairman Hilton, of the Committee, to state, in order that the Section might take prompt action, and report to the Association in general session.

Mr. Hilton said that the first recommendation was directed to the action taken at Los Angeles last year, where it was decided to concentrate the efforts of this Committee on National Legislation—to divide the subject into State and National Legislation, the Section on Education and Legislation to look after State legislative matters, while the Association's Committee on Legislation should be a committee on National legislation, and look after matters pertaining to National legislation only, thereby doing away with a multiplication of committees. This action, he said, had been adopted, but had not been carried out. He thought this was the only way for the Association to accomplish anything before Congress. His idea was that there should be one committee, composed of the most available men, to look after the subject of legislation before Congress, and present the views of this Association. He thought these views should be clear and definite, so the committee could present a solid front in all matters that affected the interests of the pharmacists of the United States.

President Rusby explained that the reason the Los Angeles action had not been carried out was because of a misunderstanding. He said that when he went to appoint the Committee on National and State Legislation, he remembered that there had been some question of this kind raised at Los Angeles, but he did not know the result, and did not know whether any definite action had been taken. He wrote to Secretary Caspari and asked him what action had been taken in regard to the matter, and had received a reply that he could not find any record of it in his minutes. When the Proceedings appeared, the matter was cleared up. But he had not the information at the time, and hence the mistake. He said there was no intention to vary from the instructions of the Association, and he had no doubt that it would be observed for the future.

The Chair stated that as a matter of fact, this Section had not dealt with the question of National Legislation at all, but complied with the spirit of the resolution passed.

Mr. Hilton said that he understood the attitude of the President, but wanted to clear the matter up for the future, so that the work might be conducted along the proper lines.

The Chair called for the next recommendation, and Mr. Hilton explained that this was in regard to the establishment of a Department of Public Health, and was to the effect that the Association should endeavor to have incorporated in that bill when it was considered by Congress some provision to provide for a Bureau of Pharmacy.

* See page 487.

The Chair stated that he would entertain a motion that this recommendation be accepted and referred back to the Association in general session for final action.

Mr. Hallberg said he thought the Chairman of the Committee on Legislation would be familiar with what had been done along that line. Some comment on the bill had been made in the April "Bulletin" to the effect that all sorts of bureaus were provided for, except one on pharmacy, and the bill should not receive the support of the pharmacists, and should not pass. He said a copy of this article was sent to the introducer of the bill, Senator Owen, of Oklahoma.

Mr. Hilton asked Mr. Hallberg if any action had been taken by his office, or himself, looking towards the preparation of any amendment along that line, and Mr. Hallberg replied in the negative.

Mr. Hilton said he thought some action should be taken. He knew nothing of such a letter having been received. He said the bill had not yet been considered by the House, but was still in the Senate, and the advocates of the bill had had a hearing, if he remembered correctly, and had made a very poor showing, and had injured the bill more than they had helped it. He said that they had ample opportunity to amend the bill, and his plan now was to take some definite steps towards amending the bill. The recommendation was, that an amendment should be prepared along that line.

The Chair said that, as he understood the recommendation, it was that the Section recommend to the general Association to prepare an amendment to the National Health Bill, providing for a Bureau of Pharmacy.

Mr. Stewart suggested that with this be coupled the request that it be referred to the Committee of One Hundred for the Advancement of Science, of which Professor Fish was Chairman. He said he had talked to Professor Fish on the subject recently, and he knew he would appreciate such reference very much.

The Chair stated that the motion was, then, that the Committee draw up an amendment and send it to the Committee of One Hundred for the Advancement of Science.

And the motion was so put and carried.

Mr. Hilton said the next recommendation was in regard to supporting any bill providing for the regulation of alcoholic beverages, as long as that bill made ample provision for the druggist's procuring his alcohol for use in manufacturing medicinal pharmaceutical preparations. He moved that the recommendation be adopted and referred to the Association in general session.

This motion was duly carried.

Mr. Hilton said that the next recommendation was in regard to a bill to regulate the manufacture and sale of smoking opium, advocating the support of such a measure.

On motion, this recommendation was adopted.

Mr. Hilton stated that the next recommendation was in reference to Federal control of the sale of narcotic drugs in interstate commerce, and the recommendation was that the Association support the Cullom Bill bearing on this question. He said this was written before any other bill was introduced in Congress, and he could not do otherwise than report in favor of the Cullom Bill. He said the Cullom Bill was a revenue measure, and as every one who was familiar with the subject of legislation knew, or should know, no revenue measure could originate in the Senate, that duty being conferred by the Constitution on the House of Representatives. The Committee on Finance in the Senate could not act on the Cullom Bill, but Congressman Foster, of Vermont, had introduced in the House of Representatives a bill that was very similar to the Cullom Bill—in fact, practically the same, with just the change of a few words; and that bill should be supported, provided there were a few modifications. He did not see the necessity of including in that bill a provision for prohibiting the sale in interstate commerce of cannabis indica, as he did not think any one had done any harm with that; and it might be well, also, to consider the advisability of eliminating coca leaves. He said he thought all the organizations engaged in the handling of drugs, especially the Wholesale Drug-gists' Association, had gone on record very clearly in opposition to that particular point in regard to cannabis indica and coca leaves, but they were willing to support any measure that regulated the sale in interstate commerce of habit-forming drugs. He thought the Association should say "habit-forming" drugs, and he did not think that, at the present time, coca leaves and cannabis indica were sufficiently used in this sense to be included in that list. He moved that the Association go on record in support of the Foster Bill, with certain modifications.

Mr. Hallberg said that he was opposed to any regulation of drugs on a tax or revenue basis, except as an interstate measure.

Mr. Hilton responded that this is what the bill provided.

Continuing, Mr. Hallberg protested vigorously against this proposition, of every dealer in every State of the Union having to go to the Internal Revenue Collector of his district, paying a dollar and "getting a tag" every year. He thought it was degrading to the profession of pharmacy—"this idea of being lined up with the rum-sellers and tobacco dealers." The revenue laws were established for the purpose of raising revenue, and this would be a mere incident of the law, and he thought this regulation could not be tolerated by pharmacists. If it was to be confined to interstate commerce, he had no objection. He was equally opposed to the Foster Bill, as it was along the same lines. Mr. Hallberg said he thought proper regulation on this subject could hardly be expected, unless there was established a National Department of Health, with a Bureau of Pharmacy provided for, "with men of our own selection, who understand this

business, and understand what the public ought to have in the way of protection, and also understand our rights and privileges in the matter." He moved as a substitute that the recommendation be changed to the effect that this Association approve of any proper regulation for the handling of narcotic or habit-forming drugs in interstate commerce.

The Chair asked if the substitute was acceptable to the original mover, and Mr. Hilton replied that he had no objection, if it was the will of the Association. He could see no objection to the inclusion of this provision in a revenue bill, where it would come under the control of the Revenue Department. He reminded the members that this situation had been brought about by the acts of certain pharmacists, in the promiscuous sale of habit-forming drugs between the States, where the State laws prohibited such sales within the State. This was true of a good many druggists, and especially of the commission and supply houses, and there should be some means by which these people could be reached, where the State laws could not reach them. He did not care about the means; he was after results.

Mr. Hynson, referring to Mr. Hallberg's objection to having this matter come under the revenue laws, said it did not seem to him at all discreditable to pharmacy that it should be so. He had taken out a retail liquor dealer's license for a great many years for the privilege of selling alcohol, and he did not consider that it reflected on him in any way. He said he understood the object was to get the splendid organization of the Internal Revenue Department, "the best in the world," in control of the sale of these drugs, and he was heartily in favor of it, and thought it would result in the purification of the drug business from this evil.

The Chair asked Mr. Hallberg to state his motion again, and he said that it was that the Section was in favor of such regulation in the sale of narcotic and habit-forming drugs, so far as interstate commerce was concerned.

This motion was seconded by Mr. Dittmeyer, of West Virginia, and carried.

Mr. Hilton said there was one other recommendation in the report of the committee that he thought should be taken up and considered carefully: That a bill had been introduced by Congressman Coudrey, providing that all drugs shipped in interstate commerce should be of the standard prescribed by the U. S. Pharmacopœia or National Formulary; and where there was no standard specified by either U. S. P. or N. F., giving power to the Secretary of Agriculture to establish such standards. Mr. Hilton said he thought the second end of that proposition needed no argument; that if pharmacists could have standards established by the United States government for anything for which there was no standard at the present time, and these standards did not interfere with the U. S. P.—which they would not, under the provisions of that bill—that they should certainly accept it. The first proposition, however, compelling all

drugs entering into interstate commerce to be of the standard as prescribed by the U. S. Pharmacopœia or National Formulary meant an amendment to the National Food and Drugs Act; that, as all knew, there was a provision in that act allowing a deviation from that standard, provided it was clearly and explicitly stated on the label what the standard was. He said his idea had been all along that the greatest mistake in the Food and Drugs Act was that provision which allowed drugs to enter interstate commerce of "any old" standard at all. It might be explicitly stated on the label what the drug was, but that did not prohibit that drug, after it went into trade, from being used by unscrupulous persons for the purpose of sophistication and adulteration. He said if it were possible to have fair, just, reasonable standards adopted by the U. S. P. and N. F., such as could be met in the ordinary conditions of supply for these drugs, then he was in favor of this proposition. But he thought this point should be carefully considered before the Association acted on it.

The Chair asked Mr. Hilton if he intended by his remarks to make a motion covering his ideas in this matter, and Mr. Hilton replied that he would now make a motion that the second clause of this bill, providing for the establishing of standards by the Secretary of Agriculture, where no standard was provided for in the U. S. P. or N. F., be approved, and that the first provision be supported, provided fair, reasonable and just standards were adopted, so that they could be met in the ordinary supply of these drugs.

Mr. Mayo suggested the separation of the two motions, and that all reference to the first proposition be eliminated, and that no action be taken on that at this time, as the standards of the Pharmacopœia could not be changed just now.

Mr. Hilton then stated the effect of the motion in regard to empowering the Secretary of Agriculture to establish standards where such were not provided in the U. S. P. and N. F., and Mr. Stewart seconded the motion.

Mr. Raubenheimer called attention to the fact that, two years ago, the Association had placed itself on record as favoring the creation of such standards.

Mr. Rusby said that while it might be true that there was some such committee, it would be found, inevitably, that there would be drugs not included in that committee's report.

The vote on the motion as amended, limiting it solely to the approval of the proposition that the Secretary of Agriculture should have the right to establish standards, when none were provided in the U. S. Pharmacopœia or National Formulary, was taken by division, with the result that the motion was adopted by a vote of 37 favoring the proposition to 25 against it.

The Chair declared the motion adopted.

The Chair stated that this concluded the consideration of the report of the committee, which would now be referred to the Association in general session.

The Chair called for the nomination of officers of the Section for the ensuing year as the final order of business, and Mr. Remington nominated for the office of Chairman, Mr. Charles W. Johnson, of Seattle, and for Secretary, W. J. Teeters, of Iowa. He explained that Chairman LaWall requested that his name should not be put in nomination, although it has been customary to renominate the Chairman to serve a second term.

The Chair called for nomination of Associates on the Committee, and Mr. Remington nominated Mr. J. W. Sturmer, of Lafayette, Indiana. Mr. Cliffe nominated John C. Wallace, of Newcastle, Pennsylvania. Mr. Mayo nominated Philip Asher, of New Orleans. Mr. C. Caspari, Jr., nominated H. P. Hynson, of Baltimore, but he declined. Mathias Noll, of Atchison, Kansas, was nominated by Mr. Sayre, but he likewise declined. Mr. England nominated W. L. Cliffe, of Philadelphia, but that gentleman withdrew his name from nomination.

Mr. Hallberg said he wanted to make a nomination for Secretary. He thought that the Secretary should be a member, and possibly Chairman, of the Committee on National Legislation, so as to concentrate the work in the hands of one person. He thought if the right man could be found to do this statistical work, where he would be right in touch with everything, and could furnish this valuable statistical report every year, it would be well to keep him in that position for, say, five years. He believed the retiring Chairman, Mr. LaWall, was the man for this place, and he, therefore, nominated him for the office of Secretary.

Mr. LaWall responded that he must respectfully, but firmly, decline this nomination.

The Chair stated that before entertaining a motion to adjourn and turn this session over to the general Association, he wanted to announce that the reassembling of the session would take place at 3 p. m. sharp, when a number of papers of importance would be read.

On motion, the Section then adjourned to 3 o'clock p. m.

SECOND SESSION—THURSDAY AFTERNOON, MAY 5, 1910.

Chairman LaWall called the second session of the Section on Education and Legislation to order at 3 o'clock p. m., and stated that the first order of business was the election of officers for the ensuing year. He called attention to the fact that there was as yet but one nominee for each of the offices to be filled, and said that, unless there were other nominations, he would sustain a motion to elect these gentlemen by acclamation.

Mr. Holzhauer, seconded by Mr. E. F. Cook, so moved, and the motion was put and carried.

The Chair declared that Charles W. Johnson, of Seattle, had been elected Chairman; W. J. Teeters, of Iowa, Secretary, and Messrs. J. W. Sturmer, of Lafayette, Indiana; John C. Wallace, of Newcastle, Pennsylvania, and Philip Asher, of New Orleans, Associates on the Committee.

The Chair stated that the Section had before it the report of a special committee appointed at the Los Angeles meeting last year, on the importation of opium and cannabis indica, to be presented at this time, and he would ask the Secretary to read it, together with the correspondence attached.

The Secretary read said report as follows :

RICHMOND, May 4.

To the Section on Education and Legislation of the American Pharmaceutical Association:

We, your committee on the resolutions presented by G. H. P. Lichthardt, have duly investigated and have been unable to find the conditions prevailing as described in the preamble and therefore, deem it inadvisable for the Association to take any further action at the time.

Respectfully,

E. G. EBERLE,
LEONARD A. SELTZER,
GEORGE F. PAYNE.

LICHTHARDT RESOLUTION.

WHEREAS, The National Government has very rightly safeguarded our people by prohibiting the importation of opium for illegitimate purposes; and

WHEREAS, It has been found that another narcotic and habit-forming drug, to wit, the various forms of cannabis indica as used in the far East as intoxicating agents, has been introduced to take the place of opium; and

WHEREAS, The American Pharmaceutical Association has ever opposed the importation, sale and indiscriminate use of all narcotics; be it

Resolved, That this Association request the National Government to pass such laws and regulations that would stop the practice of such importations into the United States of America.

G. H. P. LICHTHARDT.

The Chair called for action on the report just read, and Mr. Mayo, seconded by Mr. Ladish, moved that the report be adopted, and the motion prevailed.

The Chair next called for report of the Committee on Chairman's Address, and asked Mr. Army, of Cleveland, to take the chair while the report was being read.

Mr. McGill, of the committee, presented the report as follows :

REPORT OF COMMITTEE ON THE CHAIRMAN'S ADDRESS.

The Chairman of the Section on Education and Legislation has not in his address put forth certain propositions which call for action at this meeting, and of which the committee is expected to report approval or disapproval. But he has done as well in giving an excellent discussion of proper methods of teaching and the duties of the pharmacist with respect to keeping up with the progress of his profession and acting as an instruc-

tor of the public in regard to new pharmaceutical preparations, and warning the public against the use of such as are inefficient or injurious.

The practice of some druggists "in giving tacit endorsement to such preparations by allowing their names to be used in connection with advertising them" cannot be too severely condemned. "Unless the rank and file of pharmacists awaken to a sense of their responsibilities in such matters," the Chairman says, "there may come a fulfilment of the frequently expressed prophecy of a division of the members of the profession into two classes, one of tradesmen, whose energies shall be restricted to handing out what somebody else has put up, and the other of professional pharmacists in the true sense of the word, who shall enter into the heritage which has awaited them for many years."

The committee in agreeing with the Chairman only begs leave to add that such a division seems almost the only way of clearing up the present confusion in the methods and courses of pharmaceutical instruction in our schools and preserving the right and title of the pharmacist to equal standing with members of other professions.

The committee wishes to draw especial attention to the question raised by the Chairman, "whether it would not be advantageous to construct an educational system in pharmacy based upon a judicious plan in which electives are permitted." The special lines of work now open to pharmacists in chemistry, bacteriology, microscopy and the manufacture of pharmaceutical preparations almost demand the provision of different courses of study to prepare for them properly; and it may be seen by reference to catalogues that they have been introduced into a number of schools.

The address of the Chairman held the close attention of the audience, and the committee is confident that the expression of its own endorsement and commendation meets the approval of the members of the Section.

Respectfully submitted,

J. T. MCGILL,
A. B. HUESTED,
A. B. LYONS.

The Chair called for action on the report, and on motion of Mr. Stewart, seconded by Mr. Burge, it was ordered accepted, to take the usual course.

Chairman LaWall resumed the chair.

The Chair stated that the first formal paper for consideration of the Section was one on chemical laboratory courses, by Frank X. Moerk, of Philadelphia, which, in the absence of the author, would have to be read by title, under the rule. He said he wanted to present this paper to the Section for action, so that it might go through the proper channel.

On motion of Mr. Cliffe, seconded by Mr. Mayo, the paper was ordered received and referred to the Publication Committee, with the recommendation to publish in the Proceedings. The full text of said paper here follows:

LABORATORY COURSES IN CHEMISTRY.

BY FRANK X. MOERK.

In answer to a request made by your Chairman for a short paper on the above topic, the following has been prepared:

While chemistry is admittedly in the main a laboratory study, students must have some preliminary knowledge of chemistry, and should this be found lacking or deficient it becomes the duty of the teacher to remedy this condition.

For some years past methods of instruction have been in vogue by which the students are gradually introduced into the study of chemistry, that is to say that electro-chemical character, valence, formulas and reactions with their explanations, are taken up under the elements and their compounds; the results of this method, however, show that many students do not obtain a sufficient working knowledge of these fundamentally important points; the writer therefore is of the opinion that this part of the work should be given in oldtime allopathic doses, and that the student be compelled to master it by consistent application since there are but few tests and experiments which cannot be expressed in the form of reactions or equations. For the encouragement of the student stress should be placed upon the fact that the thousands of observations and investigations made during the past 125 years can be systematically arranged and studied in groups, and that this kind of study is an advantage which students of the present time have and of which they should avail themselves.

This theoretical part followed by a course of experiments illustrating the preparation and properties of the important elements and their compounds will lay a good foundation (1) for qualitative analysis, if the experiments include the usual analytical tests, and (2) for quantitative analysis if the experimental course includes the preparation of some chemicals using the reactions and molecular weights as the basis.

Qualitative analysis should be presented as a study involving, in the order of the frequency of application, (1) solubilities, (2) volatile or gaseous products or non-volatile residues and (3) formation of colored solutions. A proper development of the reasoning power of the student in explaining the different steps in the separation of groups will be of very great help in taking up quantitative analysis.

In taking up this last-mentioned branch the earnest student will realize his deficiencies in the first part of the plan outlined, because all quantitative work requires the thorough understanding of reactions and these in turn demand a knowledge of valence in constructing the formulas of reacting substances. The various branches of quantitative analysis will present an opportunity for discourses upon modern physical and chemical theories, as solution, ionization, precipitation, etc. The quantitative analysis of mixtures of inorganic salts in which the student formulates his own methods, using gravimetric, volumetric or gasometric methods or combinations of these, will afford splendid practice prior to taking up the analysis of inorganic industrial materials and products.

Organic Chemistry can be taken up in the same systematic manner:

Theoretical consideration of organic compounds.

Preparation of organic compounds.

Qualitative tests for the usual elements.

Class and individual reactions.

Melting, boiling and solidifying points.

Specific gravity.

Fractional distillation.

The use of refractometers and polariscopes.

Quantitative determination of the usual elements.

Determination of molecular weights.

This is then followed by the Analysis of Industrial Organic Compounds using the arrangement as given in Sadtler's Industrial Organic Analysis and "Bulletin" of Chemistry No. 107, Dep't of Agriculture and the U. S. P., 8th Revision for official substances as in the assay of volatile oils, alkaloidal and resinous drugs; qualitative tests for alkaloids extracted in the assay processes should be made to establish their identity.

Toxicology including the determination of inorganic and organic poisons as well as the synthetics proscribed by the Food and Drug Law.

Finally the proximate analysis of organic mixtures can be taken up for consideration.

While many pages could be written by going into greater detail, the intention of your Chairman, I believe, has been met by this outline in which the subjects are taken up in logical sequence; it is possible in this arrangement to point out the importance and application of the earlier portions in the more advanced work.

The Chair stated that the next paper was one by George. M. Beringer, on False Standards in Pharmaceutical Education.

Mr. Beringer presented his paper as follows:

FALSE STANDARDS IN PHARMACEUTICAL EDUCATION.

GEORGE M. BERINGER.

The student of pharmaceutical history cannot fail to note the course of pharmaceutical education in America. Prior to the establishment of the schools of pharmacy the education of an embryo-druggist consisted in the store experience or practical training acquired by serving an apprenticeship with some druggist or in the dispensary of a physician and the meagre book instruction obtained by reading the few books on materia medica and chemistry found in the limited library of the preceptor. Until comparatively recent years, this was the foundation for the business possessed by a majority of those engaged in handling drugs. Many of these old apprentices gained a practical knowledge and a manual dexterity by actual experience with some of the processes of pharmacy that are now greatly neglected. Their training was that of the store entirely and the pendulum was swung to the extreme of the practical, and for years, even after the establishment of schools of pharmacy, this practical store experience was deemed the most essential part of the training of the pharmacist.

The only requirements for admission were integrity, strength, diligence-

and perseverance and these were compensated by a meagre monetary consideration and a business and moral training under the personal supervision of the preceptor. Yet, in those early days the drug business was considered one of the high and honorable callings and an apothecary was quite as much respected in his community as is the pharmacist of to-day. The late William J. Jenks, of Philadelphia, once said to the writer: "The sons of the very best families in the city used to be brought to us as apprentices." Can we say that to-day?

As a direct result of state pharmacy laws and the efforts of the, by far too many, schools of pharmacy, there has been exerted an influence on the education of pharmacy and the practice of pharmacy which in some respects is deserving of our highest encomium and in other respects is deserving of severe condemnation. The writer is not a pessimist nor a stranger to the problems of the pharmacy and of pharmaceutical education of this day and generation, but believes that certain entangling alliances and pedantic efforts are leading pharmaceutical educators and examiners astray.

With the advent of an army of teachers to educate the rising generation of pharmacists there have been inaugurated marked changes in the curriculum, character of studies and methods of teaching. Many of these teachers are specialists and a majority are devoid of any experience whatever in the real problems of the drug store and its successful management. Naturally impractical and pedagogical views are evidenced in their work and utterance. With all honor to their high ideals and the laudable desire for advance which we believe actuates them, we cannot close our eyes to their impracticability and the fact that if their students attempted to put their teachings into practice 99 out of every 100 would fail in the hurly-burly of business that accompanies the drug store of to-day.

The attitude of these idealists is only too often that depicted so plainly by Professor Henry Van Dyke in the following abstract: "The academic atmosphere has its dangers, of which the greatest are a certain illusion of infallibility, a certain fever of intellectual jealousy, and a certain dry idolatry of schedules and programmes. But these infirmities hardly touch the mass of students, busy as they are nowadays with their athletics, their societies, their youthful pleasures. The few who are affected more seriously are usually cured by contact with the larger world. Most of the chronic cases occur among those who really never leave the preparatory institution, but pass from the class to the instructor's seat, and from that to the professorial chair, and so along the spiral, bounded ever by the same curve and steadily narrowing inward."

One of the falsities of the modern (?) system of pharmaceutical education is the deliberate, determined and persistent effort to minimize the value of drug-store training. Schedules and rosters are purposely so arranged as to occupy most of the time of the student and so preclude

store employment and crowd out the necessary practical experience that will be so vitally important to his future business success. It is the boast of many of these schools that their students devote the entire time to the laboratories and lecture rooms. It is amusing to note, however, that some of these, as if to apologize and make amends to the student, announce that they have installed a model store when he will be taught the art of handling and selling such wares as nursing bottles, food warmers, sick room requisites, etc., etc., according to the most modern and approved methods. Can such child's play in a toy drug store serve in any sense for the actual experience in the real store with its lessons in salesmanship and practical merchandising? Is not this present-day teaching swinging the pendulum to the other extreme of pedagogic theory?

I believe that the consensus of opinion among thoughtful pharmacists is that the capable clerk and successful proprietor is he who as a student receives a full measure of both store experience and collegiate education.

He has "the mastery of the way to do things, the accomplishment that counts for future work."

One of the evil effects of the false educational atmosphere is too often exhibited in the perverted mentality and self-satisfying pride of the student. How many have met the embryo-pharmacist who could write an erudite chapter on the scientific methods of sterilizing an eye water but considers it beneath his dignity to keep the counter on which he compounds clean or to properly wash the utensils used in preparing the solution and the bottle to contain it. Such a drug clerk will have to unlearn much and learn the essentials of the calling that should have been first impressed and his affectation and pride will have to be rubbed out "by contact with that larger world" and perhaps he may then be ready to say with Emerson "One of the benefits of a college education is to show a boy its little avail."

It is the writer's purpose to particularly direct your attention to one of the requirements that within recent years has been promulgated by one of the state educational departments by which the registration of a college of pharmacy is dependent upon the number of hours devoted to instruction and it is further declared "how this must be divided into laboratory and recitation hours and that all instruction must be in day sessions prior to 6 p. m."

This appears to be a bald and bold attempt to establish *time* as a criterion and not quality or results. It manifestly gives undue prominence and consideration to what is only a minor element in estimating the real standing and value of any course of education. It appears to the writer as an exhibition of the big stick by pedagogues who have most likely exceeded the authority conveyed in the pre-requisite law. There are other elements of far greater importance than time in estimating the real standing of any educational institution. The location, proper construction,

equipment and teaching facilities are advantages that alone outweigh time in importance.

Still more important is the ability of its teachers. We have all known professors who could impart more actual instruction in one hour than others could in six. Some lecturers gain and hold the attention of their audience and impress readily their facts, while others put the same audience to sleep or talk to empty benches. So that such a regulation would actually place a premium on incompetent teachers who can waste the time of students in either the laboratory or lecture room. Is not Dr. Van Dyke's type a better one: "I like the teacher who shows me not merely where he stands, but how he got there, and who encourages and equips me to find my own path through the mass of books and the tangled thickets of human opinion."

Not all students are in the same category mentally nor of the same temperament. Some can more readily grasp the facts than others. One prefers to learn from books, the other is impressed by lecture experiments, and another must personally perform the experiments before the facts are mentally stored. A teacher of many years' experience and of national reputation, in a recent letter to the writer says: "It is a grave question if in the modern demand for more laboratory instruction, whether we are not going too far in this direction, and it seems to me that much depends upon who is lecturing and giving the instruction. Good laboratory instruction gives better results than listening to a poor lecture. It is not the number of facts which a lecturer presents to the student which count, but it is the number which the student can retain, which makes for sound education."

The facility for acquiring knowledge cannot be regulated by rules and regulations issued by any state official, and time is certainly a useless factor. The teacher alone must be the one to decide how the truths can best be impressed upon each individual student and no state board should endeavor to decide for the teacher by arbitrary rules and division of time.

This regulation places all colleges of pharmacy and all of their students in the same class without considering the actual existing differences. Some schools, notably, the departments of state universities, obtain their students young and fresh from the secondary or high schools, while in others the students are more mature and have usually spent some years since the preliminary education, in store work in acquiring the means and a proper foundation for a thorough and practical pharmaceutical education. The latter have a number of advantages over the former gained by actual contact with the drugs and chemicals of the processes and apparatus. Is it not reasonable to assume that a different kind of instruction is necessary for these two classes of students and that the former class will need much more of the elementary and laboratory training than the latter who have already largely acquired this by actual experience?

Further, should not due allowance be made for such store training? The amount of such allowance and the modification of the instruction due to such practical work should be left with each school as a local problem which under present conditions its faculty can best solve.

The writer is convinced that a definite period of actual store or manufacturing laboratory experience should be required as an entrance prerequisite by every college of pharmacy.

This meaningless and false standard for deciding the registration of a school of pharmacy, once promulgated was blindly adopted and followed by a number of the State Boards of Pharmacy. It is surprising how self-respecting men in quasi-official positions can hastily and thoughtlessly accept such a yoke of dictation.

It is certainly not fair to the applicant for registration that his knowledge and experience *alone* should not be the *proper* legal test of his fitness and determine his right to be licensed as a pharmacist. That these should be offset and nullified by an arbitrary ruling that his registration shall depend upon the number of hours of instruction that is now given by the college from which he is graduated, is certainly untenable. Can any one believe that this is the correct interpretation of the state pharmacy laws or that such a construction is based upon equity and would be sustained by judicial decision? Has not the time arrived when this ultra-dictatorial policy of the State Boards and Departments should be discontinued and pharmaceutical education be permitted to develop normally along correct lines?

The common error made by teachers and examiners is to imagine that their diploma signifies a finished pharmacist, instead, it is merely the admission to that great school of life itself.

The following words of Professor Henry Van Dyke in this respect are again peculiarly applicable: "Let us keep our colleges and universities true to their function, which is preparatory and not final. Let us not ask of them a yearly output of 'finished scholars.' The very phrase has a mortuary sound, like an epitaph. He who can learn no more has not really learned anything. What we want is not finished scholars, but well-equipped learners; minds that can give and take; intellects not cast in a mould, but masters of a method; people who are ready to go on forward wisely towards a larger wisdom."

The Chair said he was sure the members had enjoyed listening to this very able paper, which was now open for discussion.

Mr. Hynson took sharp issue with Mr. Beringer, and said that, with the greatest respect to the author, he was compelled to say that this was the narrowest presentation of a subject he had ever heard him deliver. It was inconsistent with his general broad view of things, and he could not understand it. It was surprising to him that a man like Mr. Beringer

should not be better informed as to conditions. He thought his premises were altogether false. He thought if Mr. Beringer had soberly considered the conditions of his own surroundings when he first went into the drug business he could have counted on his fingers the really qualified pharmacists then in business that he knew, and he must have been driven to the conclusion that the percentage of good, qualified pharmacists at that time was immeasurably less than it was to-day. He thought that there could be no possible doubt of this proposition. Mr. Beringer seemed to have the idea that the world was going backwards, when everyone knew it was progressing rapidly, and if it progressed in one direction, it must necessarily in others. Personally, Mr. Hynson said he had great comfort in having found that there was a false halo thrown over "old times." He himself remembered practically every pharmacist in Baltimore, and a great many of their characteristics, when he went there a green, scared country boy, away back in 1875, looking for a position; and when he recalled the conditions in pharmacy in Baltimore at that time, and then thought of the army of really able, educated pharmacists of to-day, he thought it was one of the most glorious tributes that could be paid to the progress made in pharmacy. He regarded it as a serious mistake to place a boy of thirteen in a pharmacy, without any chance to acquire an education. He did not agree with Mr. Beringer's contention that he should be given four years in the drug-store and get his education afterwards. Continuing, Mr. Hynson said that there were always pathfinders in every century, who led the march of progress in the uplift of the masses, and the masses of one century stood where the pioneers of the previous century had stood. He thought Mr. Beringer's paper showed a false conception of the situation, and he believed that it was a great hindrance to the advancement of pharmacy to have a paper like this presented in this day and generation.

Mr. Ladish took exactly the opposite view from Mr. Hynson, and thought that gentleman misunderstood Mr. Beringer's paper. He commended the point Mr. Beringer had made so clear, that the tendency at present was to swing the pendulum too far the other way in the direction of theoretical education. Mr. Ladish referred to his twenty-odd years of experience in the active practice of pharmacy, and said he did not have the opportunity to avail himself of all advantages of the schools; but experience had shown him that the "finished product" that came out of the schools of pharmacy was sometimes lamentably weak in certain respects. He regarded Mr. Beringer's paper as standing for a continuance of the work along educational lines, but a warning not to lose sight of the fundamental principles of the drug business.

Mr. Husted said he had been very much interested in the paper presented, and endorsed what the author had said. He could not agree with Mr. Hynson in his criticism, as he believed that store experience was an absolute necessity in the make-up of the finished pharmacist. To illus-

trate his position, he told of an address made by Chauncey Depew to the graduating class of a certain university, in which he had reminded them that a theoretical education was the complement of a practical education, and said that of two engineers, one with college training on the scientific side of engineering, but without practical experience, the other brought up to practical experience only, he would rather trust his life to the practical man than to the theorist. And so with pharmacy, the practice of the art was not entirely scientific, but in its true sense a combination of science and experience. Mr. Beringer in his paper had pointed this out, and he agreed with him that the pendulum was swinging too far in the direction of pedagogic theory, and the tendency was to lose sight of the desirability and necessity of practical experience. He thought the paper was worthy of commendation and serious consideration.

Mr. Hays said the thought had occurred to him as Mr. Beringer was reading his paper that he must have gotten hold of a very poor clerk, with a diploma, and had an unsatisfactory experience.

Mr. Mason thought all must agree in large measure with what had been said about the necessity of practical training in the colleges of pharmacy; he did not think there could be any difference of opinion about that. But the discussion had been based on a misunderstanding of Mr. Beringer's paper. There must be store experience, but he thought there might be room for difference of opinion as to when the store experience should be had. The question was: Must it begin before the boy entered the college of pharmacy? Law, medical and theological students got practically no experience until they were graduated. The grievance he had against the old-line, independent colleges of pharmacy in this country, in their insistence upon store experience prior to their college education was this: That the boy entered upon his work at the tender age of ten or twelve or fourteen years, as a messenger boy—a sort of "roustabout." Probably in three cases out of four he found a better-paying place in a grocery or department-store and quit, while the boy who stuck got some four or five years of store experience, and then went to the college of pharmacy. He ventured to say that many of those present had been educated in this way, and they were a credit to the profession. But the almost universal fact was, that such boys were not proper subjects for education, and they did not get out of the college of pharmacy what they ought to get; and they were not equal, in his judgment, to the boy who had first gone through the grammar school, or perhaps had had four years of high school work, and then entered the college of pharmacy, and afterwards had the necessary store experience. He thought all must agree that in this way a better class of students could be had, and they would be a greater credit to the profession. If it was insisted always that the boy must have had store experience before entering the college of pharmacy, it meant that the pharmacist must often take an ill-prepared boy, and make him a messenger-boy, or put him at the soda fountain, to start with.

Mr. Eliel said he simply wanted to say in connection with this paper that, after an experience of some forty-nine years, first as an apprentice, then as a clerk in a drug store, and finally as proprietor of a drug store, he thoroughly agreed with the conclusions and deductions of Mr. Beringer in his paper. He agreed with Mr. Mason, however, that to take a boy of thirteen, deficient in preliminary education, and put him in a drug store as a "roustabout," and undertake to give him practical experience in a drug store previous to his entering a college of pharmacy, would be doing a great injustice to the pharmacist, and in the majority of cases a great wrong. Of course, there were exceptions to that rule—as in the case of men like Mr. Hynson, who had started in at the age of thirteen, and who had done fairly well.

Mr. Hynson responded to this that he was an "apt scholar."

Continuing, Mr. Eliel said that these exceptions were few and far between. The whole question of a prerequisite requirement before examination was one that had never been thrashed out thoroughly; but, in his experience, he had found that when he had a boy far enough along in school, after he had worked for some four or five years, he would make a good student in any school of pharmacy, and would be a credit to the profession when he got through. He said he had had experience with all kinds of boys, including the kind Mr. Mason had spoken of, and he had come to the conclusion years ago that he only wanted boys who would be a credit to the profession when they got through. He had had no trouble in getting boys of this type, and he did not think anybody would have, if they went about it in the right way. He concluded by saying that he was in thorough accord with the idea that Mr. Beringer intended to convey; he believed that the pendulum was swinging too far on the side of theoretical education.

Mr. Beringer, responding to the criticisms that had been made upon his paper, said he expected when he presented it to get a good "dressing-down." He said that Mr. Hynson had entirely misunderstood the premises on which his paper was based; that nowhere in that paper had he suggested that a boy of thirteen should be taken into the store, nowhere suggested that a boy without a preparatory education should be taken into a college of pharmacy. His argument, he said, was based on premises that he had not used. Neither was his paper based on the premises Mr. Hays had referred to. For thirty-four years and over, Mr. Beringer said, he had been practicing pharmacy, in daily contact with the mortar and pestle, and he was not ashamed of it. But he did not start in the work without a proper preliminary education, and he did not regret that he had practical familiarity with all classes of the pharmacist's work; he was proud of it. Personally, he did not believe that any college of pharmacy, no matter how scientifically or professionally educated the teacher was, could give that actual training he got from coming in contact with cus-

tomers in the store. There might be some questions about the proper time for having this store experience. He had expressed as his personal opinion that the young man should have a certain amount of store experience before he entered the college of pharmacy, and he was satisfied that such a young man would have a foundation for acquiring and understanding knowledge that he would not have otherwise. Speaking from the standpoint of the educator, Mr. Beringer said he had been in contact with the work of education for a good many years; that he had studied the subject, and was thoroughly in sympathy with higher education—as much so as any man in the room could be; but he did not believe in exaggerating the idea of mere time of study in the college of pharmacy—the number of hours—and making that the sole standard of efficiency. He thought that no man could argue that time alone was a factor to use in deciding the standing of any applicant for registration, nor for entering the school of pharmacy.

Mr. Meisner said that in all the years of his experience in the practical retail drug field he had never heard of a better exposition of, or a more clean-cut statement regarding, the real conditions as they existed than he had heard here in this paper of Mr. Beringer. He said he had found it necessary throughout his long business career to engage a great many men; and he had repeatedly engaged men who had simply had a grammar-school or high-school education, and had immediately entered upon the practical work of pharmacy; and he could say truthfully that those men who had simply gone through the schools of pharmacy were not in the same class with the men with the grammar-school or high-school education who had had the same number of years of practical experience in in the drug-store. Therefore, he fully concurred with everything Mr. Beringer had said.

The Chair said if there was no further discussion of this subject, the paper would be referred to the Publication Committee, with recommendation to publish.

On motion of Mr. Ladish, duly seconded, it was so ordered.

The Chair called for the reading of what he said was one of the most valuable papers before the section, one on Patents and Trade Marks, by F. E. Stewart, of Philadelphia.

Mr. Stewart gave a verbal extract of his paper, the full text thereof being as follows:

PATENTS AND TRADE MARKS IN THEIR RELATION TO PHARMACAL SCIENCE AND PRACTICE.

BY F. E. STEWART, M. D.

The practice of medicine in all its branches is founded upon altruism. It is generally recognized that prevention is better than cure. The wonderful progress of preventive medicine in its fight against disease has

resulted in an enormous decrease in the number of cases of malaria, typhoid fever, diphtheria, smallpox, scarlet fever, yellow fever, cholera, plague, and many other diseases, from the treatment of which physicians derived an income. The discovery of the causes of diseases and their prevention has resulted in a corresponding decrease in the income of physicians and pharmacists.

Another cause for the decreased use of drugs in the treatment of disease is the increased knowledge and skill regarding their therapeutic application. The ancient shot-gun is giving way to the modern rifle in prescribing.

Greater knowledge and skill in the practice of the pharmacal arts is also playing an important part in decreasing the amount of drugs employed. As the knowledge of pharmacology increases the demand for experts in pharmacy and pharmacal therapy will increase; but drugs will no longer be used with the freedom characterizing medical practice in previous generations. The history of the past twenty-five years amply illustrates this fact.

The expert in pharmacognosy with his knowledge of botany and microscopy is teaching us how to select medicinal plants, how to grow them under proper conditions of climate and soil, and how to detect adulterations and sophistications. The expert pharmaceutical chemist is discovering new active principles, new methods of synthesis, new methods of preparation, and new methods of standardization. The expert physiologist is investigating the effects of medicines upon healthy tissues, that we may know more about their properties as therapeutic agents. The expert in therapydynamics is engaged in the study of the action of drugs on diseased tissues and is teaching us how to apply medicines in a more scientific manner. All of this knowledge is being utilized by clinicians in the treatment of the sick.

This advance in pharmacal science and practice is converting drugs into instruments of precision, but it is decreasing the amount of drugs sold, thereby proving injurious to the commercial drug business, but greatly benefiting the public health.

The question therefore confronts us, how are the practitioners of the pharmacal arts, depending as they do upon commerce in materia-medica products for their livelihood, to obtain the income necessary to continue their vocation under existing conditions? This is one of the problems we wish to consider.

Theoretically, the practice of the pharmacal arts is restricted by law to persons properly educated, trained and licensed. The practice of medicine in all its branches is supposed to be the prerogative of special classes of the community, set aside by the public and protected from unfair competition. This is considered essential to the welfare of the community. In a sense, therefore, medical and pharmacal practice are monopolies

granted to special classes in exchange for benefits conferred upon the public. The license to practice resembles in many respects grants known as patents given to authors and inventors.

ORIGIN OF PATENTS AND LICENSES.

It was from the practice of the sovereign in granting to a favorite, or as a reward for good service, a monopoly in the sale or manufacture of some particular class of goods, that the system of protecting inventions arose. The history of patent grants in England will serve as an illustration. The privilege was greatly abused by the English monarchs, grants being given for the merest pretext. Thus a grant of monopoly to sell playing cards was given because, "Divers subjects of able bodies, which might go to plough, did employ themselves in the art of making cards." A monopoly for the sale of starch was granted on the ground that "It would prevent wheat being wasted for the purpose." On such absurd and trivial grounds the rights of the people were given away by the ancient monarchs.

In the first Parliament of James the First, a Committee of Grievances was appointed. Numerous patents were brought before it and canceled, but the abuse was not corrected until the Statute of Monopolies was passed in 1623. This made all monopolies illegal, except such as might be granted by Parliament or were in respect to new inventions or manufactures. Licenses are lineal descendants of those old monopoly grants.

THE NATURE OF PATENT PRIVILEGES.

Many, perhaps the great majority of, inventors have incorrect ideas as to the nature of the patent privilege. Starting from false premises, they reason wrongly about various questions that arise, and they are never able to comprehend why laws read as they do or why the courts make certain constructions of the laws. A correct understanding of the nature of a patent grant and of the reasons upon which the patent law is based will do much to clear the difficulties that often beset inventors. The belief is very generally entertained that inventors have a natural right to their inventions, of the same kind as that given by the statute, irrespective of the actual passage of the law. Such is not the fact. (*Traite des Brevets D'Invention*: par C. Renouard. Phillips on Patents.) The right to the exclusive use of an invention is not a natural one—that is, pertaining to man in a state of nature; but, when it exists at all, it is a civil right, pertaining to man under the protection of the civil government.

An inventor has no right to his invention at common law. He has no right of property in it originally. The right which he derives is a creature of the statute and of grant, and is subject to certain conditions incorporated in the statute and in the grant. If to-day you should invent an art, a process, or a machine, you have no right at common law, nor any absolute right, to hold that for seven, ten, fourteen, or for any given num-

ber of years, against one who invents it to-morrow without any knowledge of your invention, and thus cut every one off from the right to do to-morrow what you have done to-day. There is no absolute or natural right at common law, that I, being the original and first inventor to-day, have to prevent you and everybody else from inventing and using to-morrow or next day the same thing.*

Another reason that militates against the theory that an inventor has any natural exclusive right to his invention, is that in a state of nature he would have no power to enforce his rights. In theory, his every neighbor is as strong as he, and combined they are much stronger. It may be urged that, as the inventor confers a benefit on his neighbor, by giving him knowledge of the invention, the neighbor is bound, in common justice, to make return therefor. This principle is no stronger than the one that the inventor is bound, in common justice to his fellow-men, to permit them an equal chance with himself to amass wealth, when doing so entails no injury on himself.

If an inventor has a natural exclusive right to his invention for one moment, he has it forever; and, if any limit of time can be set to such a right, only infinite wisdom is adequate to so delicate a task. To state the doctrine of natural right thus, is to show that it does not exist. The law has never recognized the doctrine of natural right; for it cannot recognize what does not exist.†

The policy of the patent law is, primarily, a selfish one on the part of the public, and only secondarily intended for the benefit of inventors, and then as a means to an end only. The Constitution of the United States gives Congress the power "to promote the progress of science and the useful arts, by securing, for *limited* times, to authors and inventors, the exclusive right to their respective writings and discoveries"; thus showing, in this fundamental legislation, that the object sought is the benefit accruing to the public.‡

The theory of the law is, that the promotion of science and the useful arts is of great benefit to society at large, and that such promotion can be attained by securing to inventors and authors, for limited times, the exclusive right to their inventions and writings. That such theory is correct, it is needless to say. It is almost self-evident, or at any rate readily susceptible of proof, that the magnificent material prosperity of the United States of America is directly traceable to wise patent laws and their kindly construction by the courts.

The patent laws promote the progress of the useful arts, in at least two ways: First, by stimulating inventors to constant and persistent effort, in

* *Am. H. & L. S. & D. Mach. Co. vs. Am. Tool & Mach. Co.*, 4 Fisher's Pat. Cases, 294.

† *Simond's Manual of Patent Law.*

‡ *Day vs. Union Rubber Co.*, 3 Blatch, 500; *Kendall vs. Winsor*, 21 Howard, 327.

the hope of producing some financially valuable invention ; and, second, by protecting the investment of capital in the working and development of a new invention from interference and competition till the investment becomes remunerative.

A patent is a contract between the inventor and the Government representing the public at large. * The consideration from the inventor is the production of a new and useful thing, and the giving to the public of a full knowledge thereof by means of a proper application for a patent, whereby the public is enabled to practice the invention when the patent expires. The consideration from the Government is the grant of an exclusive right for a limited time, and this grant the Government protects and enforces through its courts.

According to Terrill, in his treatise on Patent Laws, "The theory upon which these laws rest is that it is to the interest of the community that persons should be induced to devote their time, energies, and resources to original investigation for the furtherance of science, the arts, and manufactures. This was recognized from the earliest period of time which can pretend to be described as civilized. It is to the advantage of the whole community that authors and inventors should be rewarded, and no measure of reward can be conceived more just or equitable, and bearing a closer relation to the benefit conferred by the particular individual, than to grant him the sole right to his writing or discovery for a limited period of time."

The statute enacts, "That, before any inventor or discoverer shall receive a patent for his invention or discovery, he shall make application therefor, in writing, to the Commissioner, and shall file in the Patent Office, a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise and exact terms, as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same."

SIMILARITY BETWEEN PATENT GRANT AND LICENSE TO PRACTICE MEDICINE AND PHARMACY.

The patent grant includes the exclusive right to practice the invention. The license includes the exclusive right to practice medicine and pharmacy. The patent grant is given in exchange for the publication of the invention. The license to practice is given in exchange for professional services. Let us therefore consider the character of this service. It is essential to the welfare of the community that the knowledge of preparing medicines and applying the same to the treatment of disease be conserved in scientific forms and thus protected from pretense and error. This re-

* Ransom vs. N. Y., 1 Fisher's Pat. Cases, 252.

quirement demands that each drug and preparation be provided with a name compatible with the accepted principles of scientific nomenclature and common to all languages; that the origin, nature, composition, and method of manufacturing drugs be published and readily accessible; that the various methods be submitted to comparative tests, and the best and cheapest adopted; that standards be established for the identity, quality, and strength of medicinal products, and that all manufacturers strictly conform thereto; that claims for therapeutic efficacy be submitted to clinical test to ascertain the comparative merits of various remedies; that methods be determined to prevent adulteration and fraudulent substitution; and, finally, that all the knowledge thus evolved shall be taught to medical and pharmaceutical students, and to the professions of medicine and pharmacy at large, by means of lectures, text-books, pharmacopœias, dispensaries, medical and pharmaceutical journals, and other literature.

In co-operating with the medical profession the introducers of new *materia-medica* products must wait for therapeutic verdicts before they are able to supply clinical information of a judicial character. As stated by Professor William H. Thompson, M. D., LL. D., in his discussion on diphtheria antitoxin at the New York Academy of Medicine,* the findings of a jury, whose members should be not only competent but so numerous and of such difference in locality and nationality that all personal or local influence can be safely left out of account.

DIFFERENCE BETWEEN PROFESSIONAL AND COMMERCIAL SERVICE.

It is necessary at this point to differentiate clearly between professional and commercial service. The learned professions, namely, theology, law and medicine, are organized as fraternities, in which each member by accepting his license to practice assumes certain obligations in relation to his profession. These obligations include the donation to science of the results of experience obtained by practicing his vocation. They also include the observance of certain rules for the guidance of the members of each profession in their relations with each other and towards the public at large. When codified, these rules are known as Codes of Ethics, and each profession has its own code. The Code of Ethics of the medical profession includes rules intended to protect the practitioners of medicine in their judicial position regarding the *materia medica*. It is held by many that no person can speak impartially in regard to an article which he has for sale, especially if he possesses a monopoly thereof and has invested capital in advertising its therapeutic value. The medical profession is therefore opposed to the monopoly of *materia medica* inventions, because such monopoly destroys the judicial position of the profession.

* Medical News, October 9, 1904.

As already stated, the therapeutic verdict about any alleged remedy must depend upon the findings of a jury whose members are competent to give such a verdict. If a member of the jury controls the sale of a materia medica product he is not in a position to speak with authority in relation to its therapeutic value, and he is therefore incompetent.

Some physicians even go so far as to claim that no person who has anything for sale can be truly professional, no matter whether or not he has a monopoly thereof. If this were true, it would become necessary to find some means of support for the pharmacal profession other than commerce in materia medica products.

Carried to its logical conclusion, such a claim would prevent the members of the professions from charging fees for their services. In fact, charging of fees was formerly considered unprofessional. Physicians and barristers did not charge fees for services rendered, but accepted in lieu thereof what were known as honorariums. The amount of such honorarium was determined not by the value set upon his services by the practitioners, but by the beneficiary's gratitude and ability to pay.

Now there cannot be two codes of ethics, one for physicians and another for pharmacists. The vocation of the pharmacist is part of medical practice, and pharmacists are under the same ethical obligations as physicians. If physicians prescribe nostrums this forces pharmacists to carry them in stock to meet the demand. Physicians who prescribe such products thereby force the pharmacists to violate their ethical obligations and to become sales agents for a commercial business in materia-medica products carried on in opposition to professional usages. Under such circumstances the pharmacist cannot be a professional man and the fault is that of the medical profession. If a pharmacist doing a prescription business should in the morning throw out of stock all nostrums, before noon he would be obliged to renew his stock thereof to meet the demands of the medical profession itself. Thus the medical profession is primarily responsible for the invasion by the nostrum business of the field of pharmacal practice. Let us therefore consider the character of this invasion.

THE INVASION OF THE NOSTRUM BUSINESS.

In the study of this branch of our subject it is necessary at the outset to obtain a clear idea as to what is meant by "nostrums". The three characteristics of the nostrum business are secrecy, monopoly, and pretense. Materia medica products are not themselves animate beings capable of acting either for good or for evil. The question of ethics in this connection relates to the individuals, firms, or corporations having such products for sale.

In the issue for January 13, 1910, the editor of the official organ of the "National Association of Retail Druggists" ("N. A. R. D. Notes") thus classifies medicinal preparations.

1. Ethical Preparations.
2. Druggists' Own-Make Preparations.
3. Proprietaries.
4. Nostrums.
5. Fakes.

According to the editor, an "ethical preparation" is one "whose entire composition is known, and can be prepared by any capable pharmacist"; the "druggists' own-make preparations" are those "common domestic remedies which almost every druggist prepares himself to meet a popular demand"; the "'proprietaries', erroneously called patents, are such as have, through merit, and by the price-protecting efforts of their manufacturers, become a recognized article of merchandise in most drug stores"; the "nostrums" are those "secret and semi-secret mixtures, either with or without coined names, about whose virtues such extravagant claims are generally made to the members of the medical profession or to the public"; the "fakes" include such compounds "as are intended more to defraud the public than anything else".

When it is considered that the same preparation may belong to any one of these classes, and that some of the so-called "ethical preparations" of the pharmacopœia were first introduced as secret nostrums, it at once becomes apparent that this classification is faulty because misleading. The question is in fact one of advertising. By advertising in this connection we mean recommending, whether such recommendation be spoken, or printed on a label, or published in a newspaper. Such recommending of medicines is a form of prescribing, and as this prescribing of nostrums is usually without diagnosis let us next consider the question of

PREScribing AT LONG RANGE AND WITHOUT DIAGNOSIS.

A serious objection to the usual method of advertising medicines to the general public is that the system is one of prescribing or recommending medicines without diagnosis. This objection was pointed out by Judge Macfarland, of Pennsylvania, in his decision in the case of the Dr. Miles Medical Co. vs. the May Drug Co., as follows:

Its 'medical experts' are attempting to prescribe at long range. The attempt to diagnose cases of heart disease, for example, without a physical examination, cannot be too severely reprobated. We do not need to be told by medical authority, our own knowledge informs us that not only a careful examination, but great skill is needed to detect the numerous valvular and other diseases of the heart. Further, any intelligent, thoughtful person knows that many of the symptoms listed by the plaintiff are caused by other diseases or disorders. For one sick to diagnose his own case is the height of folly, yet this plaintiff advises the poor deluded victim to pass upon subjects often baffling the highest medical skill, to settle the nature of the disease, and then to take "Dr. Miles' Nervine", or "Heart Cure", or some other high sounding preparations of unknown ingredients, recommended in 'testimonials'.

The enormous business done by the proprietors of medicines and the serious menace

which it is to the lives and health of the public requires us to scrutinize carefully the ground upon which the plaintiff stands, and as it has shown that it belongs to the reprehensible class, we decline to grant it a decree.

The history of the nostrum business will show where the names "patent" and "proprietary" medicines originated.

At first these preparations were known as secret nostrums and claimed to be inventions or discoveries in therapeutics. In process of time some of these secrets were betrayed or divulged, and it was then found that any one possessing the necessary knowledge and having obtained the same legitimately, has a perfect right to make and sell the same things. The next move was to patent these preparations under the provision allowing the patenting of compositions of matter. The Board of Examiners in Chief finally decided that "it was never intended that any composition of matter or mixture of simples should be the subject of monopoly. If rhubarb and senna, or calomel and jalap, were for the first time put together, he who should do it, whether regular practitioner or quack, would not be an inventor or discoverer under the law. If done by a physician, it would be only the exercise of ordinary professional skill; if by another, it would be but an ignorant jumble of things having supposed virtues and benefits to be obtained by the union of known drugs." *

The nostrum manufacturers next turned to the trade-mark law for protection. The following quotation taken from a "Petition of the Proprietors of and Dealers in Proprietary Medicines, including the Wholesale and Retail Dealers in Drugs, of the United States, described in their own language the method of procedure adopted by the nostrum manufacturers.

This Petition, which was read at the Annual Meeting of the Proprietary Association of America, St. Louis, October 17-20, 1898, is as follows :

The undersigned, representing the industries mentioned, hereby earnestly petition your Honorable House of Representatives and Senate of the United States, that the War Tax upon Proprietary Medicines may be promptly or speedily revoked, for the following potent and valid reasons.

Because it is founded upon entirely erroneous ideas as to the origin and value of the medicines the general or prevalent idea being that these medicines are mere nostrums, the outcome of ignorance or greed for gain; and that they are of no value as curatives for disease and are deserving of no legal recognition.

WHEREAS, The real fact is that they, to a very large and almost universal extent, are the best and most successful prescriptions of our most advanced and successful physician. The story is simple. The physician and the more eminent he may be the more likely this result is to happen, sends his prescription to his druggist, who carefully prepares and sends it to the patient; this is followed by others and others, all made of the same ingredients and the same proportions, and they are largely or even eminently successful. The druggist is alive to this—he knows from his own observations that he has in hand a cure for a certain definite form of disease, and gives it a name and launches it upon the public as a remedy for a certain form of disease."

* Caffall MS., Vol. 18, page 322.

PROTEST OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The American Pharmaceutical Association protested against this system of business, by which the prescriptions of physicians entrusted to pharmacists are unfairly appropriated and launched upon the public as specifics for diseases. It most emphatically protested against the above statements of the secret nostrum manufacturers as unjust and damaging to the reputation of the pharmaceutical profession. There is in fact no drug which may be truly described as a specific or cure for any disease. Furthermore, the highest medical skill is required to diagnose each disease and to recognize its various stages as they develop, and no prescription will answer the same requirements of all the different stages of the same disease. When a medicine, whether it be the prescription of a reputable physician or not, is given a name and launched on the public as a *specific* or *cure*, when it is not, the person so doing is guilty of a moral wrong to the community and prohibitive or restrictive laws have been passed to control the secret nostrum business in such countries as France, Germany, Austria-Hungary, Japan, Brazil, Argentina, etc. The public should have at least the opportunity of knowing the medical ingredients and their percentage composition of every agent used for the prevention and treatment of disease, so that the people may be protected from the machinations of quackery.

It is admitted by the "Proprietary Association" in the above quotation that so-called "patent medicines" are usually not new things, and the only invention about them is that of their names. When it is taken into consideration that no one except their manufacturers knows the true composition of these nostrums, the absurdity of claiming that the names given them are trade-marks used for the purpose of distinguishing between *brands* of well-known prescriptions is apparent.

Again, as the claims made for these nostrums regarding their therapeutic value are not generally justified by the fact, it is evident that their manufacturers, when they make false representations in regard to these prescriptions, cannot come into court with clean hands to defend their alleged trade-marks. The burden of proofs must needs fall upon the advertisers of such claims, and proof cannot be forthcoming unless the true composition of their medicines is made known.*

"DRUGGIST'S OWN-MAKE PREPARATIONS."

What is the difference between "druggists' own-make preparations" and "nostrums"? That depends upon whether or not they partake of the characteristics of nostrums. As before stated, the characteristics of the nostrum business are secrecy, monopoly and pretense. The pharmacist

* Report of the Committee on National Legislation, Proceedings of the A. Ph. A., 1899. Vol. 47.

who pretends that his secret-formula, monopolized medicine is a specific or cure is just as much of a nostrum manufacturer as the unlicensed practitioner conducting his business at wholesale and advertising in the newspapers and magazines. Prescribing at short range without diagnosis is just as wrong in principle as prescribing at long range by nostrum-manufacturing houses. Any physician can relate incidents to corroborate this statement. A young man suffering with incipient phthisis went to the druggist, who prescribed a cough cure of his "own make." After fooling away about a year of precious time, the young man's condition was discovered by his physician, and he is now a charge of the State in a sanitarium for consumptives. This is merely one of thousands of cases.

It is admitted that a field for "druggist's own-make preparations" does exist, and that this field is perfectly legitimate. There are times when the physician's services cannot be secured and people are forced to resort to self-medication. The druggists should supply medicines to meet this demand, but they should not be guilty of prescribing without diagnosis. Preparations intended for self-medication should be provided with the formula and with as full information as circumstances will permit, including a list of diseases for the treatment of which they are intended, and proper directions for their use. But this field is limited to a narrow range of cases. The field should not be left to the nostrum manufacturers. The subject of domestic medicine should be considered jointly by the medical and pharmaceutical professions, and the boundaries of this field should be clearly defined. Physicians and pharmacists should co-operate in teaching the people how to use medicines in the proper manner.

METHOD SUGGESTED BY THE SUPREME COURT FOR CHECKING THE NOSTRUM INVASION.

The Supreme Court of the United States suggested an effectual method of checking the nostrum invasion, in its decision in the case of *Worden vs. the California Fig Syrup Company*, No. 35, October Term, 1902. The following quotation is taken from this decision :

Most, if not all, the States of this Union have enactments forbidding and making penal the practice of medicine by persons who have not gone through a course of appropriate study and obtained a license from a board of examiners; and there is similar legislation in respect to pharmacists. And it would seem to be inconsistent and to defeat such salutary laws, if medical preparations, often and usually containing powerful and poisonous drugs, are permitted to be widely advertised and sold to all who are willing to purchase. Laws might properly be passed limiting and controlling such traffic by restraining retail dealers from selling such medicinal preparations, except when prescribed by regular medical practitioners.

It is manifest that the legislation suggested by the Supreme Court would force all persons desiring to recommend or prescribe medicines, either as manufacturing houses or as retail druggists, to go through a course of ap-

propriate study and obtain a license from a board of examiners. This would create in this country a class of practitioners similar to the English apothecaries, who are not only licensed to practice the pharmacal arts but are also licensed to practice pharmacotherapy. In this way the legitimate demand of the public for materia medica products for self-medication, and for proper advice regarding the use of the same, is supplied.

THE TRADE MARK QUESTION.

It is axiomatic that "No one can claim protection for the exclusive use of a trade-mark or trade name which would practically give him a monopoly in the sale of any goods other than those produced or made by himself. If he could, the public would be injured rather than protected, for competition would be destroyed. Nor can a generic name, or a name merely descriptive of an article of trade, of its qualities, ingredients, or characteristics, be employed as a trade-mark, and the exclusive use of it be entitled to protection." *

"When an article is made that was theretofore unknown, it must be christened with a name by which it can be recognized and dealt in, and the name thus given it becomes public property, and all who deal in the article have a right to designate it by the name by which alone it is recognizable." †

The following statement made by the Honorable Benjamin Butterworth, Chairman of the House Committee on Patents, is of value in this connection. After listening to a debate by the Committee on this subject, he turned to the Associated Press Reporter present, and said that "While the House Committee on Patents has no right to act as an interpreter of the law, that being the function of the Supreme Court of the United States, yet, as individuals, they had a right to an opinion. It was the opinion of the Committee, after listening to the evidence presented to it by the Delaware State Pharmaceutical Society, that

(1) The registration of an alleged trade-mark does not make it valid. Registration is merely to give notice that the thing registered is claimed as a trade-mark. The validity of the claim can only be settled by the courts.

(2) The use of a trade-mark in no way restricts the free use by others of the article of merchandise to which it is affixed. It confers on the user no privilege to the exclusive use of an invention of the kind conferred by the patent law, otherwise we should have the anomaly of laws diametrically opposing one another. The patent law grants the inventor the exclusive use of his invention for a limited time, and then only on the publication of exact knowledge of the invention whereby the public may manufacture it when the patent expires, by a proper application for a patent. The use of a trade-mark, on the contrary, is unlimited in duration, and no publication is required when it is used on an invention.

(3) The public has a perfect right to manufacture and sell any article of commerce

* Canal Co. vs. Clark, 13 Wall, 323.

† Leclanche Battery Co. vs. Western Elec. Co. 23 Fed. Rep., 227.

not patented, and to do so under its proper or generic name whether a trade-mark is used in connection with the article or not. For this reason, the courts hold that names describing the article cannot be used as trade-marks on the article they describe. Otherwise the use of trade-marks would be a hindrance to competition, while the proper use of trade-marks promotes competition by distinguishing between one brand of an article and another brand of the same article, thus stimulating manufacturers to improvement in processes and methods of manufacture for the purpose of excelling each other in producing the same article of better quality or at a lower price."

As stated by the Court in the Celluloid Case, "When a name is coined by one *who uses it as a trade-mark* upon a particular article, if that name is originally a lawful trade-mark, its subsequent adoption by the public as a common appellative cannot take away the right already acquired." *

But when an inventor says, "I have invented a new kind of thing," and then coins a word to distinguish it, the coined word becomes at once the title of the thing, and, therefore, is not a lawful trade-mark, for it is self-evident that it can no longer serve the function of a trade-mark to distinguish one brand from another brand of the same article, but becomes a name to distinguish one kind of a thing from another.

It is believed by many that when a person invents a name he can have it patented or copyrighted, and thereby secure an ownership in the name itself. This, however, is an error. As stated in Circular No. 19, issued by the Librarian of Congress, Copyright Office, Washington, D. C., "The Copyright Laws contain no provision under which protection can be obtained upon *a mere name or title*. Entry cannot therefore be made in the Copyright Office for coined names; names of articles of manufacture; names of games or puzzles; names of substances; names of products, or names of medicines."

The manufacturers of antipyrin, phenacetin and many other German synthetics, have registered these names in the Patent Office as trade-marks, with the view of maintaining their monopoly after the expiration of the patents on the products. If the claims of the manufacturers had been sustained by the courts, then these names could have been held for all time as private property, and the monopoly created by patents on products continued for an indefinite time. The decision of the United States Supreme Court in the Singer Sewing Machine Case, in 1895, prevented such monopoly. The decision reads as follows:

The results, then, of the American, the English, and the French doctrine universally upheld is this, that where, during the life of a monopoly created by patent, a name, whether it be arbitrary or be that of the inventor, has become, by his consent, either express or tacit, the identifying and generic name of the thing patented, this name passes to the public with the cessation of the monopoly which the patent created. Where another avails himself of this public dedication to make the machine and use the generic designation, he can do so in all forms, with the fullest liberty, by affixing such name to

* Celluloid Co. vs. Cellointe Co., re Fed. Rep. 98.

the machine, by referring to it in advertisements, and by other means, subject, however, to the condition that the name must be so used as not to deprive others of their rights or to deceive the public, and therefore that the name must be accompanied with such indications that the thing manufactured is the work of the one making it, as will unmistakably inform the public of that fact.

DIFFERENCE BETWEEN PRODUCT AND BRAND.

It is important to distinguish between products and brands. As pointed out, each new *materia medica* product should be impartially discussed by professional societies and press. This is impracticable when the product is monopolized. Physicians hesitate to report, fearing reprisals on the part of the manufacturers if reports are adverse, or loss of professional reputation, if favorable. Products should therefore be free to science and commerce, to permit their discussion without fear or favor.

Brands and brand names, on the contrary, should be controlled by the manufacturers. Every brand should be so labeled as to permit of its ready identification, so that the manufacturer may be held responsible for its character, quality, and strength.

Brands may be protected by labels or trade-marks. When the identity of a product is apparent, it is not necessary that the name of the product should appear on the label. It is not necessary to label a ham, as such, for everybody recognizes the identity of the product. The brand mark serves to distinguish the source or origin of the ham, and nothing else is required. But when a new *materia medica* product is placed on the market, it is necessary to label it with a name by which it can be readily identified and dealt in. And in addition to the name of the product, the name of the manufacturer should appear on the label to permit identification of the brand.

Instead of the manufacturer's name a pseudonym or *nom de plume* may be employed to designate the brand. We have "York Mills" Linen, "Eagle Brand" condensed milk, etc. Sometimes the name of the manufacturer, and the brand name appear on the same label, as in the case of condensed milk.

Some manufacturers conceal the identity of the products and use fanciful names as labels, claiming such names as trade-marks, brand names, or word-marks. Hexamethylenamine was placed on the market under various names, as "Urotropine," "Cystogen," "Formin," etc. Each manufacturer evidently intended to mislead the profession by giving the impression that these names indicated different products, forgetting that names thus used are either descriptive or deceptive. If descriptive, the names are not trade-marks; if deceptive, those who claim them as trade-marks cannot go into court with clean hands to defend their claims.

When a *materia medica* product is provided with two names on its label, one claimed as the name of the product and the other as the name of the brand, the question at once arises whether the latter is in fact a

brand name or a synonym. This is a very important question and one requiring the most earnest consideration by physicians, pharmacists, and manufacturers. If the names are synonymous, then the pharmacist is justified in dispensing any brand he has in stock, no matter what name is used by the physician in prescribing. If, on the contrary, the name claimed as a trade-mark is recognized as such by the medical profession, and physicians intend to specify brands, then pharmacists who do not dispense the brand specified are guilty of fraudulent substitution.

It is fair to assume that as a rule pharmacists are honest and conscientious in their practice. It is probable that most pharmacists in our large cities are graduates of pharmaceutical colleges and are thoroughly competent to practice their art. But pharmacy, like every other vocation, has its black-sheep, and physicians should therefore either discriminate in favor of those pharmacists who are known to be both conscientious and competent, or should specify the brand of some manufacturer known to have the necessary facilities for maintaining proper standards.

What is needed is a profession of pharmacy; viz., an organization of professional pharmacists, guided by a properly enforced code of ethics, and working in co-operation with the medical profession, of which pharmacy is such an important branch.

PROTECTION OF BRANDS BY PROCESS PATENTS.

In most foreign countries patents are not allowed for materia medica inventions, but patents on processes are permitted. In Germany, for example, patents are not allowed for "inventions relating to articles of food, whether for nourishment or for enjoyment, and medicines, as also substances prepared by chemical processes, in so far as the inventions do not relate to definite process for the preparation thereof."

"If the invention relates to a process for the production of a new substance, all substances of like nature are considered as having been made by the patented process until proof to the contrary is given."

Some of the evils of our product patent system are well illustrated by the "Adrenalin" patent now under litigation. Not only had von Fürth and Dr. John Abel demonstrated many of the properties of the adrenal secretion and published methods of preparation, but Oliver and Scharfer had worked out the physiologic action of this substance and indicated its usefulness in medicine. The methods of preparation were improved upon and patented by the well-known Japanese chemist, Takamine, to whom was also granted a product patent. Basing his claim upon this product patent, the manufacturer who now controls the Takamine patents is attempting to maintain for seventeen years a monopoly of all adrenal preparations. Progress in science and the useful arts is hindered, not promoted, by such a system.

"RESOLUTION AT RICHMOND."

Students of medical history are familiar with the effort made at the meeting of the American Medical Association at Richmond, Virginia, in 1881, to define the position of the medical profession on the subject of patents and trade-marks. The resolution is as follows :

Resolved, That the spirit of the code of ethics forbids a physician from prescribing a remedy controlled by a patent, copyright or trade-mark. This, however, shall except a patent upon a process of manufacture or machinery, provided said patent be not used to prevent legitimate competition; and shall also except the use of a trade-mark used to designate a brand of manufacture, provided the article so marked be accompanied by working formulæ, duly sworn to; and also by a technical, scientific name under which any one can compete in manufacture of the same.

This resolution was referred to the Judicial Council and turned down by Dr. N. S. Davis, the founder of the American Medical Association, on the ground that the endorsement by the medical profession of patents in any form was contrary to ethics. Since those days the Association has been reorganized, and it now stands in favor of patents on materia-medica products.

CONCLUSION.

Finally, I wish to emphasize strongly the fact that I am not attempting to tear down the patent system or the trade-mark system. On the contrary, this paper is intended to be constructive, not destructive. Its object is to aid in building up the ideal taught by the colleges of pharmacy; namely, that pharmacy is—or should be—a profession, organized in accordance with professional or fraternal principles, having its code of ethics in which are given rules for the guidance of pharmacists in their relations with each other, the medical profession and the public.

We must know just where the pharmacists stand as a profession before we as a medical profession are in a position to endorse the vocation of pharmacy as practiced in this country. If it is to be a nostrum business, carried on as a commercial business having as its primary object the making of money by methods which are detrimental to the public welfare, we must know it and be guided accordingly. If it is to be a profession, working in harmony with the medical profession for the prevention of disease and the relief and cure of the sick, we as a medical profession should take the profession of pharmacy under our fostering care and do all in our power as physicians to co-operate therewith.

Whether the preparation of medicines is conducted at retail by the individual druggists or is carried on at wholesale by the great manufacturing houses is a consideration secondary to the one great object in view. The retail druggists should occupy a prominent position in this country as manufacturers and distributors of medicines. To the extent that they do not possess facilities to do their own manufacturing, this work should be done

by the large manufacturing houses, with their scientific departments, aided by capital and managed by level-headed business men.

But as a medical profession we cannot endorse materia medica monopoly, whether obtained by secrecy, product patents, or misuse of trade-marks. We should not consent to any plan for building up a great commercial business in drugs, depending upon misleading advertisements skillfully worded to deceive the medical profession and the public. The practice of the pharmacologic arts should be under the proper censorship of professional men, who have been educated in our medical and pharmaceutical schools, trained by experts, and licensed to practice after their qualifications have been submitted to and approved by a board of examiners.

Then the practitioners of these arts should be held strictly accountable to laws intended for the protection of the public from ignorance, incompetence, and greed. These laws should include pure food and drug laws, medical and pharmacal laws, and ethical codes, harmoniously blended in such manner as to protect the welfare of the community. And the copy-right, patent, and trade-mark laws to be of service in this connection, should be in harmony with the general plan.

As now administered, the patent and trade-mark laws are used by the nostrum trade to protect its nefarious business. This trade twists, contorts, and stretches the patent and trade-mark laws to hide its Satanic character. It fools its victims by false promises and fraudulent claims, and those engaged in the business not only deceive the medical profession and the public, but they actually fool themselves by their own sophistries, until they half believe their own lies and begin to imagine that they are really telling the truth.

This nostrum trade has been well characterized by "Collier's Weekly" as the "Great American Fraud." The nostrum system in all its branches is a system of fraud, error, humbug and lies, whether carried on by the great manufacturing houses or by the retail druggists. The great nostrum manufacturing houses use their advertising patronage to debauch the press, medical, pharmaceutical, secular and religious, and the demand created by this advertising forces the retailers to carry nostrums in stock or to go out of business.

The retail druggists therefore attempt to fight the devil with fire, by supplying to the public nostrums of their own manufacture, in place of those advertised. But this attempt never has been and never can be successful in suppressing the nostrum trade, whether carried on individually or by great organizations of retail druggists under the guise of so-called co-operative manufacturing of household remedies.

This method of doing business cannot be classed as honest professional pharmacy. What the people have a right to demand in exchange for licenses to practice medicine and pharmacy is honest professional service from physicians, pharmacists and manufacturers of medicine. They have

a right to demand that every materia medica product shall have a name of its own by which it can be identified and dealt in. They have a right to demand that such names shall be common property and free to all who have the right to practice the pharmacal arts. They have a right to demand that each product shall be submitted to impartial investigation by the co-operative researches of competent observers; that the medical press shall be thrown open to free discussion of its properties and uses; that the source, composition, methods of preparation, physiological properties and therapeutic application, shall be submitted to such discussion without fear or favor; that the practice of the arts of selecting, preparing, preserving, compounding and dispensing materia medica products shall be conducted by educated and licensed practitioners; that the application of medicines shall be under professional control, and that they shall be used in a proper manner for the treatment of disease by those who are learned in medicine, including pathology and diagnosis; that the knowledge thus evolved by this professional service shall be reduced to law and embodied in system, and shall be taught to the professions by means of the educational machinery adapted to that end; namely, medical and pharmaceutical colleges, societies and press.

The patent and trade-mark laws should be administered by the courts in harmony with these requirements, if their objects are to be attained.

The Chair called for action on the paper just read, which he commended very highly. He said it was a paper that should be read to be appreciated, and was one that could be perused after publication of the Proceedings with interest and profit. It was a paper that called for some expression by this Section upon the subject-matter it represented, and he said he would ask Mr. Stewart, therefore, to present some resolutions which he had embodying this idea.

Thereupon, Mr. Stewart read the following :

WHEREAS, The object of the patent law is to promote progress in science and useful arts, and

WHEREAS, Progress in the science of materia medica and in the arts of pharmacology and therapeutics, upon which it is dependent, requires that each materia medica product and preparation shall have a name of its own, which is free to science and commerce, whereby it may be identified, impartially discussed in the professional societies and press, and thus prepared for a place in the U. S. Pharmacopoeia, and

WHEREAS, The practitioners of the pharmacologic arts, namely, pharmacists, chemists and manufacturers, are dependent upon materia medica commerce for a livelihood, and

WHEREAS, Commerce in materia medica requires the investment of capital and the protection of the same by the legitimate use of patents for new materia medica inventions, and trade-marks for distinguishing between brands, therefore be it

Resolved, That the Report on Patents and Trade-marks of the American Pharmaceutical Association, together with papers and discussions dealing in an explanatory way with the same subject, be referred to the manufacturing houses, with the request that they shall co-operate with the American Pharmaceutical Association in solving the several important problems presented by said report, and that the Committee on Patents and Trade-

marks be empowered to take such action and report the results of the conference at the next meeting of the American Pharmaceutical Association.

The Chair called for action on the paper and resolutions as read, and on motion of Mr. Burge the same were adopted.

The next paper called for was one by E. Fullerton Cook, of Philadelphia, on the subject of a commercial training for pharmacists.

Mr. Cook presented his subject as follows; exhibiting in connection with his text, as illustrative of his methods, various samples of blank-books, registers and forms, actually used by his students, and explained their good points :

TEACHING BUSINESS METHODS TO THE PHARMACIST.

BY E. FULLERTON COOK, P. D.

It is no longer necessary to defend a position which advocates and insists upon a thorough course in business training for the man or woman entering pharmacy. The tremendous advances, as business men, which pharmacists have made during the last ten years, is amazing, and we face today a condition wherein there must be adopted a system of financing, managing, purchasing and selling, as applied to the retail pharmacy, equal in efficiency and economy to the best. The continuance of business life itself is dependent upon the pharmacist taking such a position. Competition is constantly growing more keen; various commercial organizations among druggists are offering better buying methods; the journals are filled with plans for combinations; chain-store schemes, buying clubs, better management, advertising, salesmanship, etc., etc., but the retail pharmacist who has individuality and true professional skill, and combines that with sane and modern business methods, has little to fear from a purely commercial competition and it is with this conception of a pharmacist that emphasis is being laid upon business training as of equal importance with the scientific.

The purpose here is to outline what it is believed such a course should embrace and to illustrate with practical methods of teaching. It would be impossible in a paper of this scope to outline every step which must be covered in the instruction. The details are numerous and cover a large field, and, for the reason that it is specialized, the many phases of business activity which the pharmacist is called upon to enter must be enlarged upon. The following suggestions have been used during the past year and represent the development after nine years of teaching these subjects. Starting some years ago with a course in double-entry book-keeping, as taught in commercial colleges, it was soon recognized that the time spent upon so elaborate a system was useless, as no retail druggist would keep a set of double-entry books unless his business was large enough to warrant the employment of a book-keeper.

Gradually, therefore, the methods have been evolved, constantly striving for simplicity, efficiency and practicability. At the beginning of the course, the student is asked to put himself in a position where he must face the questions that arise on entering business, *i. e.*, into his hands are placed the facts concerning the purchase of a retail drug store, he being one of the parties to the transaction. •

This opens for discussion the many factors which should be considered at such a time. The following questions are taken up :

1. Has the training and experience been sufficient to insure success?
2. Would it not be better to become a manager until better experienced?
3. What is the amount of available capital?
 - a. Possible sources of capital.
 - b. Value of character.
 - c. Proven ability to save money.
 - d. Life-insurance policy as an asset.
4. Is a partnership preferable to an independent ownership?
 - a. Partnership.
 - b. Corporation.
 - c. Limited partnership.

IF THE CONDITIONS JUSTIFY THE BUYING OF A STORE, THE NEXT QUESTIONS CONSIDERED ARE:

1. *Is it desirable to secure an established business?*
 - A. If unacquainted with the store, investigate:
 - a. Neighborhood.
 - b. Former reputation of the store.
 - c. Amount of *bona fide* business for preceding year.
 - d. Inventory of stock, with unbiased valuation.
 - e. Depreciation in fixtures.
 - f. Terms of the lease. (A long term usually desirable.)
 - g. Unpaid accounts.
 - B. Is it desirable to succeed to the business of a former employer? (Although the points given in A must also be fully considered under these conditions, which have long been believed to be ideal, yet they usually answer themselves by the situation in which the man finds himself.)
2. *Should a new business be established? If so there should be a careful investigation of the following :*
 - A. The character of the neighborhood.
 - B. Terms of lease as to
 - a. Rent.
 - b. Time to run, etc.
 - C. Purchase of fixtures.
 - D. Purchase of stock.
 - E. Advertising new business, etc.

IT HAVING BEEN DECIDED TO GO INTO BUSINESS, THERE IS NEXT TAKEN UP

1. *How shall the payments be made?*
 - a. Proportion of cash.
 - b. Promissory notes; their character and significance.

2. *Relations with a bank.*

A. Shall it be a national bank or trust company?

B. Opening an account.

- a. Signature.
- b. Depositing of cash and checks.
- c. Stopping payment on checks.
- d. Overdrawing accounts.

C. Check-book.

- a. Drawing checks.
- b. Keeping balance.

D. Bank-book or pass-book.

- a. Balancing pass-book.
- b. Paid checks returned.

E. Use of drafts.

3. *Fire insurance.*

- a. Insure full value.
- b. Have inventory.
- c. Reliable company.

4. *Credit.*

- a. Mercantile agencies.
- b. With wholesale houses.
- c. With banks.

5. *Clerks.*6. *Personal salary.*

This should be included among the regular expenses of the business and should be drawn systematically; the amount depending upon the condition of the business.

7. *Letter writing.*8. *Mercantile license.*9. *Internal revenue license.*10. *Credit Customers.*

- a. Advantages.
- b. Caution in allowing credit.
- c. Regularity in rendering bills.
- d. Collections.

11. *Purchasing supplies.*

- a. Stock-book or card-index catalogue.
- b. Want-book.
- c. Order blanks.
- d. Price lists.
- e. Quantity of discounts.
- f. Value of giving attention to salesmen.

12. *Paying bills.*

A. Ten-day discount.

- a. Good credit.
- b. Best prices.
- c. Independence.
- d. Money saved.

B. Borrowing from bank if necessary.

After considering these points the supposition is that the student has begun business, and the transactions for each day for a month are out-

lined and then actually carried out. These include the opening of a bank account, the drawing of a lease, payment for the store in cash and notes, (the student making out the promissory notes) the employment of clerks and porter, payment of rent, mercantile license and internal revenue tax, by checks, the ordering of supplies from a number of different classes of dealers, the writing of letters to secure credit, to make corrections in bill, etc., depositing in bank, of money received from the sales, the payment of petty expenses, opening accounts and charging goods to customers, discounting and payment of bills, the use of day-book, cash-book, check-book, and ledger, and the making-out of bills for customers. These transactions are made to resemble as nearly as possible the conditions of business, and the book-keeping, up to this point, is done exclusively by single entry. As the larger percent of the book-keeping of an average retail drug store will consist of the work already given, and as it can be satisfactorily handled by single-entry, emphasis is laid on this part of the work to insure efficiency in what will perhaps represent 98 per cent. of the book-keeping required.

This portion of the work having been concluded, there follows the question of gross profit, net profit and resources and liabilities. For the few accounts which now are considered, a double-entry system is taught. Total amounts, for the period covered, such as all money due from, and also paid by, credit customers, all money received from cash sales, and all money paid out, are posted in the proper accounts in the ledgers. (All expenses should be carefully assembled; such as personal salary, rental, depreciation on goods, fixtures and building—if owned—all losses, as breakage or uncollectable accounts, salaries, light, heat, insurance, etc.)

An inventory must be taken and this credited to the several accounts. Now a statement showing all profits and all expenses is made, thereby determining the net profit or loss, as the case may be, for the time covered. Usually a statement is taken from the double-entry ledger showing all resources and all liabilities.

Having completed a systematic method for the keeping of accounts, many of the modified forms are illustrated, and their value and application explained; such form as card-index ledgers, loose-leaf ledgers, the bill form of ledger, with carbon duplicate, Wray's Ledger, the Caskey scheme, the cash-register plan, Moore's systems, loose-slip account, etc., etc.

Following the book-keeping, lectures are given on general subjects as insurance, legal papers, letter-writing, ordering goods, banking, business law, notes, drafts, transportation, advertising, State Pharmacy Laws, National Pure Food and Drug Laws, etc.

I may say that twenty or more years ago, Prof. Remington began giving the students several lectures each year in the College of Pharmacy on the subject of business and from this, largely through his stimulation, has been developed the present more elaborate course, given in our insti-

tution, the latter lectures of which are, today, given by him, greatly to the edification and advantage of the student body.

The Chair called for action on this paper, which he said embodied a great deal of labor, time and consideration.

Mr. Mayo moved a vote of thanks to Mr. Cook for his excellent paper. He expressed the opinion that if the Association had more of this kind of work, and more details of this sort, it would contribute substantially to an increase of membership. He said Mr. Cook has given the membership something that would appeal to the practical aspects of the retail drug business. He only wished that he had divided this paper into a half a dozen parts, and given the Association half a dozen papers on the subject. He expressed the hope that he would come back next year and give the Association something else along this line. He regarded this as one of the most valuable papers that had ever been presented before the Association, and believed such contributions should be heartily commended, as it was of vital importance to the Association to have papers dealing with practical subjects in this way.

Mr. Apple endorsed the remarks of Mr. Mayo in regard to the value of the paper last presented, and thought it was desirable to have full discussion on this topic. He said he wanted to make a plea now that the Chairman-elect of the Section on Commercial Interests for next year be given an opportunity to have a symposium on this and like subjects, by the reference of such matter, or part of it, to that Section. He thought, while educational, it was educational in a commercial way, and properly belonged to the commercial section. He believed such a symposium would be edifying and profitable.

The Chair stated he thought the incoming Chairman of the Committee on Education and Legislation would allow an elaboration of at least some form of this paper before the Section on Commercial Interests.

The Chair stated that, before adjournment, he would like the Section to take action on three papers on the program for this session, the authors of which were not present. One, he said, was on Doses in the U. S. Pharmacopœia, by C. B. Lowe, one on "Who owns the Prescriptions?" by J. Winchell Forbes, and the Third on "Teaching Bacteriology in Colleges of Pharmacy", by Albert Schneider, of San Francisco. These three papers, he said, were in the Chairman's hands.

Mr. Meissner moved that the papers referred to be received and referred to the Publication Committee, and this motion was seconded by Mr. Ladish and carried.

The Chair announced a joint session of this Section to-morrow morning, at 10 o'clock sharp, with the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties, at which time the three remaining papers upon the program for this session would be read and a symposium had upon the subject of examination questions.

On motion, the Section then adjourned.

DOSES IN THE UNITED STATES PHARMACOPŒIA.

BY CLEMENT B. LOWE.

It was considered wise by the committee in charge of the Eighth Revision of the United States Pharmacopœia to include in this work the dose of many of the articles and preparations contained therein, the object of doing so being probably to make the book more attractive and helpful to both physician and pharmacist ; and it seems that to some extent this result has been achieved. It might be thought on first reflection that the stating of a definite dose would be attractive to students as giving them an exact dose to remember, but this is not so ; a student who is asked in examination to state the dose of a drug must at present give the exact amount as stated in the U. S. P. ; there is no leeway ; he cannot as formerly say that the dose is from so and so to so and so.

It seems to the writer that it would have been of greater value to have given minimum and maximum doses and also the maximum dose for twenty-four hours, as is done in a number of European pharmacopœias. The latter is specially important and would be of great help in prescription compounding, as it can hardly be expected that the majority of pharmacists are posted in regard to the time of the elimination of drugs from the human system, and yet this largely governs the amount that can be safely taken in twenty-four hours. For instance, hydrocyanic acid is eliminated so rapidly from the system that there would be little danger in taking a maximum dose every hour ; on the other hand, potassium bromide is eliminated from the body very slowly ; indeed, when administered day after day it tends to accumulate in the body, producing untoward effects. Belladonna, a poisonous drug, rarely produces fatal results, owing to the fact that it is eliminated so rapidly from the system ; on the other hand, digitalis is so slowly excreted that it is a question whether more than two maximum doses should be given in twenty-four hours.

It would be a matter of some interest to know just what the sub-committee on doses had in mind when they introduced into the U. S. P. what are called average doses. Did they mean a dose midway between minimum and maximum, or the dose such as is ordinarily given ? If the latter was the guiding rule, then certain doses of the U. S. P. are incorrectly stated.

Let us take up in the first place doses of some of the more active drugs, for instance that of morphine, which is stated as one-fourth of a grain, which any good prescriptionist knows is greater than the dose ordinarily prescribed ; however, if this is to be taken as correct, then the dose of opium is too small and should have been two grains, as one grain of opium is considered to be equivalent in strength to one-eighth of a grain of morphine sulphate. The dose of tincture of opium is also too small and should have been, to correspond, about twenty minims. It may be answered to this criticism of the dose of opium, that in this drug we have other alka-

loids besides morphine which should be taken into account, but it must be remembered that the action of opium is largely that of morphine, which is its most active alkaloid and which is also present in larger amounts than any other; the only other alkaloid approaching it in amount is narcotine, or as some prefer to call it anarcotine, which does not add to the narcotic effects of opium, but rather antagonizes them, as it is a tetanizing alkaloid. The dose of strychnine, $\frac{1}{4}$ of a grain, seems small; thirty years ago it probably would have been an average dose, but within recent years much larger doses have been given, $\frac{1}{80}$ of a grain being prescribed oftener than any other dose. The dose of atropine sulphate, $\frac{1}{80}$ of a grain, seems small when we learn from the National Dispensatory that the dose is from the $\frac{1}{80}$ to the $\frac{1}{60}$ of a grain, but as much as $\frac{1}{20}$ of a grain is sometimes employed. The dose of corrosive sublimate, $\frac{1}{20}$ of a grain, seems rather large and might produce some colicky pains. Codeine, which has probably less than one-fourth the strength of morphine, is given in $\frac{1}{2}$ -grain doses, or only twice the strength of morphine. The dose of phosphorus is given as the $\frac{1}{2}$ of a grain, and yet in the official phosphorus pills the dose is $\frac{1}{80}$ of a grain. Why this difference? Blue pill, which our grandfathers esteemed so highly as a cholagogue cathartic, has been cut from 10 to 4 grains, the latter being less than the dose that is ordinarily taken. Hydrated chloral and potassium bromide are both given in 15-grain doses. This seems strange when we remember that there are cases on record of death from 10 grains of chloral, while on the other hand potassium bromide is a comparatively safe drug, which, according to Prof. Hare, may be taken in doses of 5 to 60 grains. The dose of acetanilide, 4 grains, has been somewhat sharply criticised. This is probably safe for a single dose, but would be distinctly dangerous if repeated often. The writer well remembers the cyanosis produced in a patient some twenty years ago (at that time the drug was used as an antipyretic), two five-grain doses being given at an interval of some hours. The lesson then learned has lasted to this day. Antipyrin is also given in four-grain doses, although it is a much safer drug than the former. It is asserted in the N. D. that "as much as 20 grains may be given without detriment." By comparison the first of these seems too large, the second too small, the dose of acetphenetidin, $7\frac{1}{2}$ grains, seems nearer the correct mark. The dose of cerium oxalate, 1 grain, seems small when we learn from the N. D. that the drug is given in from 2- to 10-grain doses. I have myself known of 30 grains being given without injurious effects, but would not sanction the giving of such large doses. The dose of bismuth subnitrate, $7\frac{1}{2}$ grains, seems small when we learn from the N. D. that the drug is given in doses of from 16 to 60 grains. The dose of cocaine hydrochloride seems a little large when we remember the untoward effects sometimes produced by no larger doses. There seems to be a discrepancy between the doses of nutgalls and tannic acid, both being given in doses of $7\frac{1}{2}$ grains, when

the former contains from 50 to 60 per cent. of the latter. The dose of potassium cyanide is given as $\frac{1}{4}$ of a grain; according to the N. D. it is $\frac{1}{12}$ to $\frac{1}{8}$. The dose of gold and sodium chloride, $\frac{1}{16}$ of a grain, also seems large; the N. D. gives it as $\frac{1}{20}$ of a grain. The dose of aromatic powder, 15 grains, while not actually injurious, seems large; it would certainly act as a warm stimulant in the stomach. When compounding powders for the medication of an infant, containing one grain each of aromatic powder, I have tasted the powder and wondered whether the effect would be beneficial to the delicate mucous membrane of the infant's stomach. The dose of sodium phosphate, 30 grains, seems small when we learn from the N. D. that as a laxative it is used in 30- to 120-grain doses and as a purgative in from 1 to 2 ounces.

The dose of chlorinated lime is given as 4 grains. The N. D. gives it as 1 to 5 grains, but it is so seldom used internally that there was little necessity of stating it. The official dose of castor oil is given as half an ounce, but this is only half the size of the dose usually demanded by people when dispensed in the pharmacy. The volatile oils seem to a large extent to have been lumped together; they are given in three-minim doses, the list consisting of the following oils, viz.: Anise, caraway, chenopodium, coriander, fennel, juniper, lavender, nutmeg, pennyroyal, pimenta, peppermint, rosemary, spearmint and thyme. The N. D. gives the average dose of oil of thyme as 2 minims and that of a number of others in the list as much larger. Oil of turpentine, according to the U. S. P., is given in 15-minim doses, which seems rather large in view of the fact that the drug is an active stimulating diuretic. It will be noticed that we have compared the doses given in the U. S. P. with those given in the National Dispensatory for the reason that the medical author of the latter book was also the chairman of the committee having in charge the matter of doses in the U. S. P.

What has been written in this brief paper upon doses has not been for purposes of carping criticism, but for the purpose of promoting constructive metabolism in this great work, of which the medical and pharmaceutical professions are justly proud.

WHO OWNS THE PRESCRIPTION?

J. WINCHELL FORBES.

In construing contracts by courts of justice, the first point considered is in all cases the intention of the parties to the contract, and it is often the case that an implication, if perfectly clear, and one which the verbiage and general construction leads to naturally, may be of greater importance than the meaning of the simple verbiage.

The transaction which takes place between a man who visits a physician, seeking treatment for some ailment, and the physician, is in the nature of a contract, and the inevitable complaint that the one treated makes, if the

treatment is ineffectual, is an indubitable proof that the treated one so considers it. That the physician himself so considers it, or at least knows that his patient does, is proved by the fact that a favorite advertising device is: "No cure, no pay," for the physician, and for the patient the expression: "I paid him my good money and he didn't do me any good." It may be considered, therefore, that the transaction between the physician, and the man or woman who requests his services, is in the nature of a contract. The intention and expectation on the part of the patient, whether he parts with his money in a single lump, or in instalments, is that he will receive certain benefits, and the physician well knows that such is the case.

The physician examines the patient, notes the symptom, and makes his diagnosis. Now, does he say to the patient, for example: "The ventricular diastole is not properly balanced with the systole, and there is a decided pathological action of the cardiac impulse—you are threatened with ingrowing toenail on the umbilicus" (and one of these two pronouncements is about as lucid as the other so far as comprehension by the patient is concerned), or does the doctor even try to translate the technical into the commonplace, and tell the man what ails him, and in non-technical terms? Not a bit of it! If he is a dispensing doctor, so called, he takes his money, gives him a few tablets, and tells him to call for more when those are gone. If he is not, he writes some hieroglyphics on a bit of paper, and tells his patient to go to a drug store with it and have the druggist do what the hieros tell him. The man takes the paper. Is he cured? Have the terms of the contract been complied with? No one would scout such a conclusion more forcibly than the man who holds the prescription in his hand. Presumably, the doctor has diagnosed correctly, and written on the piece of paper instructions for preparing the proper medicine to meet the indications, but for all that, the patient has so far not received any equivalent for his money. The actual treatment has just begun.

He wants to be cured, or at least benefited, and the method of curing is left to the doctor. The only course for the patient to follow is to comply with the directions. In compliance therewith, the man hies him to an apothecary, who translates the hieros, prepares the medicine as directed and hands the result to the patient, who is incontinently rid of his ailment. Not a bit of it!

The actual status of the bit of paper is the same as if it were written in this way: To any apothecary to whom this may be presented. Give or prepare the articles named on this paper, accompanied with direction to use thus and so.

The actual contract between the physician and the patient is, that in consideration of certain money paid to the physician, the patient is to be cured of his ailment.

If it be claimed that the money was paid the physician for the use of his

skill, and that the writing and delivery of the written prescription constitutes such use, it is no cause for complaint on the part of the patient if the medicine he gets from the apothecary does him no good. If he paid for the prescription, he got all that was coming to him. In spite of the loud-mouthed ravings of some, that : "I paid my money for that prescription, and it is mine," it is very doubtful if a single individual of the ravers could be found who would admit that with the writing of the prescription and its delivery to him he got all that was coming to him. He knows better. He had no idea of paying for any of the detailed steps of the doctor's method, but as he understood it, he was paying for the result of the method—a cure. For all he knew, his case demanded a serial course, comprising many prescriptions and various medicines, one being preparatory for others ; and the prescription written first might be proper for Monday but highly improper for the following Saturday. With a conscientious doctor, each prescription is always written from the standpoint of meeting certain present conditions, hence a renewal of a prescription, except upon the direction of the physician writing it, is an unthinkable thing. The use of the prescription for the benefit of any other person is still more unthinkable.

The written prescription may, or may not, be one of a series, and the decision rests not with the patient, but solely with the writer ; and it must be distinctly understood that it is not the business of a physician to sell formulas for curing certain diseases, for such things as specific cures for certain named diseases are unknown to medicine. The terms of the implied contract between a physician and his patient warrant no such conclusion. All that the terms imply are that a cure or alleviation of the ailment is to be the result of the treatment, the steps of the treatment resting wholly with the physician, the only province of the patient being the strict following of the steps.

Assuming that after the patient's faithful following of the first step, which manifestly consists in presenting the first prescription to an apothecary, who presumably follows its direction, the sub step, which is taking the medicine according to directions, is taken by the patient, yet no relief is experienced. What then?

The patient goes again to the physician and says : "That prescription did me no good." What happens? Does the doctor reply : "That prescription was the correct one for a man in your condition, and if it did you no good that is your own fault and not mine?" No. He asks some more questions, and either tells him to have the prescription renewed or he may write another and a different one. Is the man cured then? Hardly. It may happen that this occurs many times. The physician may write ten different prescriptions, and the patient may dose himself with that number of different medical simples or combinations and at the end be no better off than at first. Does the patient consider the terms of the contract as complied with? Not one time.

He complains. He may say : " I paid the doctor for ten prescriptions and I'm no better ; I paid that doctor twenty dollars for advice and he did me no good ; I paid that doctor twenty dollars for the use of his medical knowledge and skill and I am just as bad as I ever was." Or he may say : " I spent twenty dollars with that doctor but I am no better." In my own experience I knew one M. D. who admitted that he charged for his prescriptions, and N. A. R. D. Notes gives another instance. A doctor who will admit that is placed in a peculiar position. I quote from an address delivered by Dr. J. N. Hurty, of Indianapolis Ind.

" I do not mean to say that medicines are useless, but I do say that they cannot and do not cure disease. The old notion that nature has provided a medicine for the cure of every disease is not now advanced, except perhaps among the Indians, the quacks and the ignorant."

This is the essence of modern medical belief, and the doctor who sells his prescription (a proceeding which is neither more nor less than furnishing the formula for a medicine which will cure a certain disease) is a fraud and a cheat, and he comes within Dr. Hurty's list. He is either an " Indian" or a " quack," and he certainly is " ignorant."

The instance given by Notes is interesting. A woman got a prescription from a New York specialist. She had it filled in New Jersey. In course of time she needed more of the medicine and asked the druggist for a refill. Now, the medicine contained cocaine, and the New Jersey law prohibits the refilling of such prescriptions. She demanded the original prescription. The druggist refused to give either that or a copy, and the woman complained to the writer of the prescription, who gave her a note to the druggist requesting him to refill. The druggist still refused, and the doctor wrote him quite a long, berating letter, in which he said that the woman had paid him for the prescription and it was hers. The original prescription contained about fifteen words, and his order to refill and the berating letter about four hundred, yet the whole matter could have been settled amicably by the writing of another prescription of fifteen words ; the woman would have been able to get her medicine at once, and the druggist would not have been asked to break the law. This was a case of either the most crass stupidity or one of egoistic obstinacy on the part of the doctor, and either one shows that that particular doctor did not possess the first essential for the practice of medicine, and that his proper sphere was manual labor at the rock pile, carrying the hod or something of that nature which involves no action of the brain.

But to resume. If the patient paid for the prescriptions, he got them. If he paid for advice, he got it. If he paid for the use of medical knowledge and skill, he got it.

But when he says that he " spent twenty dollars with that doctor, and I am no better," he states unmistakably his understanding of the contract, and the fact that he complains shows that that is what he means by every

one of the other forms of statement, and by his complaint, he invalidates all claims to property rights in any of the means which are made use of by the physician. He might as well claim ownership in the tools of the carpenter who has built a coal shed for him, and the Long Catlin, and tenaculum of the surgeon who has performed a surgical operation on him. As said before, the choice of ways and means lies wholly with the physician, and the patient cares not whether the doctor gives him medicine from his own dispensary, or gives him a written order for some druggist to prepare something to order, according to the terms of that order.

The prescription as written, is simply that order, and in the majority of cases the selection of the druggist to carry out its provisions is left to the patient. The written prescription is the intermediary between the doctor and the druggist, and the patient is simply nothing more nor less than a messenger boy who delivers the intermediary.

When the terms of the written prescription are complied with, and the finished medicine is delivered to the patient, either in person or by proxy, the prescription dies the death and takes its place with the things of the past. Its terms are founded on the present—it deals with the present wholly, and except accidentally, it cannot apply to anything of the future; hence, it cannot be renewed except on the direction of the writer, if he should find that the accident has occurred.

I think it may be considered as proved that at no time has the patient any property rights in either the piece of paper or the formula written upon it, as he has paid for neither, but that he has paid for an intangible thing—a benefit to be received. The patient, therefore, cannot "own the prescription."

The written prescription being in the nature of a communication from one person to another, *must* be the property of the one communicated to, just as an ordinary letter or order; and the subject of the communication has no bearing whatever upon this fact, but the fact that he owns the communication, in no way authorizes that owner to deviate from the matters communicated. As that matter is simply an instruction to do certain things for the benefit of a certain person, who is the one who delivers the communication, the recipient has no warrant for doing those things for anyone else, and for the reason previously given, more than once, or at any future time. There is no need of dwelling on this point, for medical literature teems with protests against it.

Does the physician own the prescription?

The prescription consists of two things. First, the directions for preparation and use, and secondly, the tangible piece of paper upon which the directions are inscribed.

In the event that the doctor has devised a peculiar combination of drugs, and is in that sense an inventor, he most undoubtedly does own the only thing which gives the written prescription any value whatever; and if

he has written the name of a single thing only, the same holds good, for he has established a connection between that thing and the patient, and that is one of the steps he takes towards carrying out his part of the contract, which in no way involves a connection between that thing and any other person.

So far as the mere piece of paper, aside from its value as containing some of the results of the doctor's skill and knowledge is concerned, it is a mere record of things ordered to be done by one person, and done by another. The conclusion hardly needs stating. That piece of paper belongs to the person executing the order; but only as voucher for his authority for doing certain things named on the piece of paper. As the paper and the writing and its meaning cannot be separated, and as the writer in no way parts with his property rights by the mere description of them on the paper, and still has his property stored away in duplicate in his brain, the rights of both parties are served by the retention of the piece of paper by him who carries out its instructions, and far more effectually for the writer, than for the dispenser of the prescription, as the former has a record that he gave certain orders, but the latter *may* require a portion of the dispensed medicine, and the services of an expert analyst to show that he *obeyed* the order.

I think it is sufficiently plain that the ownership of the written prescription rests neither with the physician who writes it, nor with the patient who receives it, and that this position is proved by the construction of the original contract by the man who has received no benefits; but there is another phase.

The patient is cured. What then?

The little piece of paper with its unintelligible scrawls is at once invested with value as "My property," I bought it, and it's mine.

The average citizen under such circumstances realizes the fact that the doctor knows his business, or at least has made a good guess. He says: "I had an awful catarrh and this prescription cured me all right. It's a good thing," and he reaches out for it. He claims ownership of the written prescription. In plain words, he steals one of the doctor's tools, and only *that*, because the others are locked up. He follows the rule of some so-called business men: "Get all you can, whether it belongs to you or not."

If the patient does not own a prescription which is without value, he does not own one which has value, for value has no connection whatever with ownership.

To sum up.

The written prescription is a communication to any druggist to whom it may be presented. Therefore, it cannot be the property of the one for whom it is written, or of the one who presents it to the druggist.

In the absence of special instructions, a prescription may be filled but once, as it is presumably designed to meet present conditions and no

other ; and as it is written from the standpoint of a single individual, it may not be filled for more than that one.

As a medical means, the prescription is solely the property of the physician, who devises it and expresses it in language.

As the intermediary between the doctor and the druggist, it is simply a written communication and follows the law of all communications. It therefore remains in the possession of the recipient. This fact is enforced by the fact that after the instructions of the communication are complied with, as a *medical means*, the life of the prescription ceases and it is reduced to a simple communication.

The conclusion of the whole matter is that after a prescription is once filled it no longer can be considered as an authority and takes the rank of a simple communication, being reduced to a simple record, which should be filled by the one who carried out the instructions contained in the communication.

This conclusion is borne out by the various laws with regard to the dispensing of certain poisons, notably cocaine, etc., and the specification of these certain things is due to the general recognition by the public of the danger of their indiscriminate use. When the time comes when the public realizes the danger in the indiscriminate refilling of prescriptions, laws will be passed by all States prohibiting :

The refilling of any prescription for any but the one for whom it was written.

The refilling of a prescription for any one without the special order of the writer.

The giving of a copy of any prescription, and requiring the keeping of all prescriptions filled as a matter of record.

Such laws necessarily deny the right of ownership to the patient and the doctor as well as to the dispenser, but they vest the dispenser with the rights of a custodian, and sooner or later to this complexion will we come and the moss grown question will be decided for good.

ON TEACHING BACTERIOLOGY IN COLLEGES OF PHARMACY.

BY ALBERT SCHNEIDER.

It may be assumed that it is not necessary to argue that the subject of bacteriology should be taught in every reputable college of pharmacy. We shall therefore confine ourselves to a discussion as to the manner in which this most interesting branch of science should be presented to the students taking the regular course in colleges of pharmacy.

When some twelve or fourteen years ago, instruction in pharmaceutical bacteriology was offered, for the first time, in two or three colleges in the United States, it was made an optional course and the students of pharmacy essayed to take a certain amount of laboratory work with the students of medicine. This method was soon abandoned, for it was only too

evident that medical bacteriology was not suited to the needs of pharmacy. Bacteriology as an optional course in colleges of pharmacy is and always has been wholly unsatisfactory, as are all optional courses of instruction, at least when considered as a factor in the regular college curriculum. Optional courses for special students in the higher branches of learning are wholly consistent, but there is absolutely no place for an optional course in our colleges of pharmacy. The curriculum of studies must be carefully mapped out and every subject taught should be obligatory. An optional course cannot be a factor in a general educational scheme leading to a degree which is supposed to be granted upon the satisfactory completion of certain uniformly representative courses of instruction. Accordingly pharmaceutical bacteriology should either be included in the regular course of instruction in colleges of pharmacy or it should be excluded.

While this phase of the subject could no doubt be argued and is being argued by some pharmaceutical educators, the writer is fully satisfied that pharmaceutical bacteriology should be made an obligatory course of study in every reputable college of pharmacy in the United States. Some of the more general argumentations as to why and how the subject should be taught have been given elsewhere * and we shall at this time devote ourselves to a more specific setting forth of the way in which the subject should be presented to students of pharmacy.

The course in pharmaceutical bacteriology must be adapted to the other courses of instruction. According to the curriculum of studies in the leading colleges of pharmacy the time which may be allotted to pharmaceutical bacteriology must of necessity be very short. After several years of experimenting the writer has finally arranged the work as follows, having in mind a three years' college course.

During the senior year of the regular two years' course leading to the degree of Graduate in Pharmacy, Ph. G.—or Pharmaceutical Chemist, Ph. C.—a course comprising eighteen to twenty-two hours of lectures (one lecture each week), with class demonstrations and several laboratory periods, is given. This is intended to give the students a general survey of the subject in harmony with the progress recently made in the science of pharmacy, and incidentally, this course serves as a preparation for the work in bacteriology during the third year, now generally designated as the graduate course or graduate year.

The lecture course should cover the following subjects approximately in the order given :

I. *General Introduction.* Purposes of the course. Relationship of pharmaceutical bacteriology and medical bacteriology, etc.

* "Bulletin" of Pharmacy. Dec. 538-539, 1897. Proc. A. Ph. A., 48: 186-189, 1900 Merck's Report 19: 141-142, 1909.

II. *Historical.* A brief summary of the history of the science of bacteriology from the earliest conceptions regarding "disease effluvia," "spontaneous generation," etc., up to the modern conception of vaccines, disease immunity and antitoxins.

III. *The General Morphology of Microbes.* The structural characteristics of microbes; form types, and the earlier attempts at a classification based upon form; occurrence of cilia; spore formation; etc.

IV. *The Classification of Microbes.* Their position from the evolutionary standpoint; their problematical relationship to the lower groups of fungi; the system of Migula and of other authorities; classifications as to form, as to activities displayed, as to occurrence, etc.

V. *The General Physiology of Microbes.* Relationship of bacterial cell activities to moisture, light, temperature, etc.; substances formed as the result of bacterial activity; ptomaines, leucomaines, enzymes, gases, toxins, etc.; assimilation, growth, etc.; propagation of bacteria; cell division and spore formation; etc.

VI. *The Range and Distribution of Microbes.* General distribution; altitudinal and latitudinal distribution; bacteria of earth, air and water; bacteria in and upon plants and animals.

VII. *Harmful Microbes.* Pathogenic bacteria, of plants, of animals; objectionable bacteria of soils, of commercial products; etc.

VIII. *Useful Microbes.* Of soils; of plants; of animals; in the dairy-ing industry; retting bacteria; bacteria as pest exterminators; etc.

IX. *Microbic Culture Media.* Bacterial foods in general, liquid and solid; preparation of artificial culture media; use of indicators; sterilization of culture media; etc.

X. *Microbic Cultures.* Purposes of bacterial culturing; pure cultures; isolation of bacteria; estimating the number of bacteria in solids and liquids; etc.

XI. *Staining Microbes.* Staining methods in general; special stains; purposes of staining; cell stains; spore staining; use of mordants; etc.

XII. *Examination of Microbes.* Temporary and permanent mounting; use of oil-immersion lenses; identification of bacteria.

XIII. *Immunity from Disease.* Natural immunity; acquired immunity; race immunity; etc.

XIV. *Phagocytosis.* Phagocytes as the guardians of health; micro- and macro-phages; leucocytosis in wound infection; pus formation; the "laudable pus" of the older surgeons; etc.

XV. *Wright's Opsonic Theory.* Evidence of the existence of opsonins; opsonins in their relationship to leucocytosis; the opsonic index; the treatment of disease based upon the opsonic theory; etc.

XVI. *The Manufacture of Sera.* Antitoxin of diphtheria; other sera.

XVII. *Small-pox Vaccine.* Manufacture of small-pox vaccine; history of vaccination; value of vaccination.

XVIII. *Bacterial Vaccines.* Manufacture of vaccines; autogenous and heterogenous vaccines; tuberculins; etc.

XIX. *Disinfectants and Disinfection.* Disinfectants and their use; sick-room disinfection; disinfection of public buildings; etc.

XX. *Pasteurization and Sterilization of Liquids and Foods.* Pasteurization of milk and other liquids; preservation of foods and food preservatives; etc.

XXI. *Fermentation and Fermentation Products.*

XXII. *Theoretical Bacteriology.* Ultra-microorganisms; diseases of which the primary cause is unknown; virulency and potency; etc.

XXIII. *Bacteriological Work for Pharmacists.* Equipment of a bacteriological laboratory for pharmacists; bacteriological work which may be done by pharmacists, such as making culture-media for physicians; incubating bacterial cultures; sterilization of pharmaceuticals; etc.

The above outline is intended as a suggestion only, indicating the more important bacteriological topics that are to be covered by the lecture course, which is to be supplemented by an occasional oral or written review. Furthermore the various pieces of apparatus and appliances used in bacteriological work are to be exhibited before the entire class and their use fully explained. In addition to the above, some three or four laboratory periods should be devoted to the examination of living bacteria (motile, non-motile, large and small); mounting and staining bacteria; examination of bacterially infected substances; examination of bacterial slides of well-known bacteria; etc.

During the third or graduate year of college instruction, each student is required to devote a portion of every college day to laboratory work, as follows:

I. *Preparation of Artificial Culture Media.* Making the more common media as Nutrient Bouillon, Nutrient Gelatin, Nutrient Agar, Gelatin-Agar, Sugar-free Bouillon, Glycerin Bouillon and a few others.

II. *Preparation of Glassware.* Cleaning glassware; plugging test tubes with cotton; filling test tubes with culture media; sterilization of test tubes, Petri dishes, etc.; making tube slants; etc.

III. *Preparing Culture Media for the use of Physicians.* Sealing tubes, filled with culture medium, hermetically, ready for immediate inoculation; preparation of sterile throat swabs; preparation of special media which may be required by physicians; etc.

IV. *Special Work.* After the student has familiarized himself with the preparation of culture media and other necessary laboratory details, he is required to make bacterial cultures; isolation cultures; determining the bacterial content of water supply, of sewage, milk, syrups, waters, tinctures, fluidextracts; etc.

Usually the special work is limited to one problem, as a bacteriological examination of galenicals or of syrups, etc., since the time allotted (one

year) does not warrant undertaking more extended lines of research. The special work might also include making blood counts; microscopical examination of sputa, ejecta, urine, bacterially contaminated foods, drugs, animal tissues, etc.

Wherever possible the course in bacteriology should be supplemented by visits to biological laboratories for the manufacture of sera and vaccines. Students should also be assigned special reading. The reports on bacteriological and related subjects issued from time to time by the U. S. Public Health and Marine Hospital Service are of special value. Practical work in the disinfection of closets, large rooms, buildings, sewage, out-houses, etc., should also be done. In fact the pharmacist who has completed the course in bacteriology as above outlined should be fully qualified to actively assist the public health officers whenever the occasion may require.

California College of Pharmacy, San Francisco.

THIRD SESSION—FRIDAY MORNING, MAY 6, 1910.

The third session of the Section on Education and Legislation was held jointly with the National Association of Boards of Pharmacy and the Conference of Pharmaceutical Faculties, and was presided over by Chairman LaWall, of the E. & C. Section, who called the Section to order at 10:30 a. m.

The Chair called attention to a resolution offered by Mr. Asher at the first session, on yesterday morning, in connection with a paper read by Mr. Kebler on "The Need of a Federal Poison Label," in which the writer made the statement that many preparations upon the market at the present time, while they contained poisonous doses of powerful substances, were not required to be labeled "Poison." At the close of the reading of that paper the Section had placed itself on record as favoring the requirement that such a label be placed on remedies of that kind, and Mr. Asher's resolution was:

Resolved, That this Association recommend that the Foods and Drugs Act be modified, so that a suitable poison label will be placed on all packages of drugs where twenty times the stated dose of said substance would have toxic action.

The Chair called for action on this resolution.

Mr. Rudder, of Indiana, asked if this included physician's prescriptions, as well as other packages, and Mr. Cliffe responded that, as he understood Mr. Kebler's request, it was to be applied to these preparations, as well as to proprietary articles.

The Chair agreed with this view, but said he simply wanted to give the resolution as offered by the gentleman authorized to prepare it.

Mr. Pritchard said he thought the word "modified" in the resolution

was unfortunate. It was hardly proper to "modify" the law ; it should be made stronger than that.

The Chair said he hardly thought the resolution was in line with the object of the session of yesterday, and Mr. Prichard suggested that it was not quite full enough.

Thereupon the Chair said he would entertain a motion that the resolution be redrawn, and that the Chair appoint a committee to do that. Acting upon this suggestion, Mr. Mayo moved that the Chair appoint a committee of three, to put this resolution into such shape as conformed with the understanding had at the last session, and that this committee take action immediately, and report to the Section. This motion was seconded and carried, and the Chair said he would appoint on this committee Mr. Pritchard, Mr. Cliffe and Mr. Rudder.

The Chair stated that, although in the nature of repetition, he wanted to ask Mr. E. F. Cook to devote a few minutes at this point to an explanation of his methods of book-keeping for pharmacists, as set out in his paper presented yesterday, at which time very few members were present, and then the members could examine his illustrative matter at their leisure, after the close of the session.

Mr. Cook presented his subject accordingly, exhibiting and showing the use of various ledgers, forms, etc., used in his course of teaching at the college with which he was connected.

The Chair stated that Mr. Hynson had a matter that he wished to bring up at this time, and he would be given the privilege of the floor for ten minutes to do so.

Mr. Hynson said the matter he wanted to bring before the Section was as to the form in which the text of the National Formulary was gotten up, and he desired to bring out some discussion on that subject, as he thought it would be a matter of interest to the members. In his judgment, it was a matter of urgency, and one requiring a good deal of thought. He referred the members to some three or four typewritten sheets of comparative formulas distributed among them, and first invited attention to the official formula for syrup of bromides, and criticised it in several respects. His first criticism was directed to the reprint of the word "bromide" four times in succession, instead of the ditto ("") mark under the word as it first appeared, as shown in his proposed form on the last half of the sheet. His next criticism was as to "Tincture of Vanilla (U. S. P.)" His objection here was that it was unnecessary to indicate that the product should be U. S. P. or N. F., because that was always implied and understood. This criticism would also apply to the three remaining items of the formula. He also called attention to what he thought was an improvement in the proposed formula, of having two separate columns for the quantities given, in grams and cubic centimeters, respectively, as compared with the method employed in the official formula of placing all in

the same column. He called attention to the form of directions, which he had changed.

The official formula criticised and the substitute proposed here follow :

SYRUPUS BROMIDORUM.

Syrup of Bromides.

Potassium bromide.....	80 Gm.
Sodium bromide	80 Gm.
Ammonium bromide	50 Gm.
Calcium bromide.....	25 Gm.
Lithium bromide.....	8 Gm.
Tincture of vanilla (U. S. P.)	82 Cc.
Compound tincture of cudbear (N. F.)....	16 Cc.
Compound syrup of sarsaparilla (U. S. P.).....	450 Cc.
Syrup (U. S. P.), a sufficient quantity to make.....	1000 Cc.

Dissolve the bromides in the compound syrup of sarsaparilla and 400 Cc. of syrup; then add the tinctures, and sufficient syrup to make 1000 Cc.

SYRUPUS BROMIDORUM.

Syrup of Bromides.

	Gm.	Cc.
Potassium bromide.....	80	
Sodium "	80	
Ammonium "	50	
Calcium "	25	
Lithium "	10	
Tincture of vanilla		80
Compound tincture of cudbear		15
Compound syrup of sarsaparilla		400
Sugar	425	
Water		225
Syrup, a sufficient quantity to make		1000

In a solution of the bromides, in the water, dissolve the sugar; to this add the compound syrup of sarsaparilla, the tinctures and enough syrup to make the whole measure 1000 Cc.

Mr. Hynson's next criticism was as to the formula for aromatic vinegar, and he objected to the use of capital letters in naming the ingredients of the formula, as also the use of both Centigrade and Fahrenheit thermometers, as he thought one was sufficient.

The original and proposed formulas here follow :

ACETUM AROMATICUM.

Aromatic Vinegar.

Oil of Lavender.....	0.5 Cc.
Oil of Rosemary.....	0.5 Cc.
Oil of Juniper.....	0.5 Cc.
Oil of Peppermint.....	0.5 Cc.
Oil of Cinnamon.....	0.5 Cc.
Oil of Lemon.....	1 Cc.
Oil of Cloves.....	1 Cc.
Alcohol.....	175 Cc.
Acetic Acid (U. S. P.).....	175 Cc.
Water, a sufficient quantity to make	1000 Cc.

Dissolve the Oils in the Alcohol, add the Acetic Acid, and lastly, enough Water to make 1000 Cc. Warm the turbid mixture, during several hours, at a temperature not exceeding 70° C. (158° F.), taking care that it shall not suffer loss by evaporation. Then set it aside for a few days, occasionally agitating, and filter.

ACETUM AROMATICUM.

Aromatic Vinegar.

	Cc.
Oil of lavender flowers.....	0.5
Oil of rosemary.....	0.5
Oil of juniper	0.5
Oil of peppermint	0.5
Oil of cinnamon	0.5
Oil of lemon.....	1.0
Oil of cloves.....	1.0
Alcohol	175.0
Acetic acid	175.0
Water, a sufficient quantity to make.....	1000.0

Mix the acetic acid with the volatile oils, dissolved in the alcohol, and add enough water to make one liter. Keep this mixture at a temperature between sixty and seventy degrees, centigrade thermometer, several hours, avoiding loss of volume by evaporation. Afterwards, agitate occasionally, for a few days and filter.

Mr. Hynson next took up copaiba mixture. He called attention to the fact that in the National Formulary the general heading "Copaiba Mixtures" was used, and under that the sub-head, "1. Lafayette Mixture," and thought the form of heading given in his proposed formula, where he showed, "Compound Copaiba Mixture (Lafayette's)" was an improvement.

The official and proposed formulas here follow :

MISTURÆ COPAIBÆ.

Copaiba Mixtures.

1. Lafayette Mixture.

Copaiba.....	125 Cc.
Spirit of Nitrous Ether (U. S. P.).....	125 Cc.
Compound Tincture of Lavender (U. S. P.).....	125 Cc.
Solution of Potassium Hydroxide (U. S. P.).....	32 Cc.
Syrup (U. S. P.)	300 Cc.
Mucilage of Acacia (U. S. P.), a sufficient quantity to make..	1000 Cc.

Mix the Copaiba with the Solution of Potassium Hydroxide and the Spirit of Nitrous Ether. Then add the Compound Tincture of Lavender, and lastly, the Syrup and Mucilage of Acacia. Mix the whole thoroughly by shaking.

MISTURA COPAIBÆ COMPOSITA.

Compound Copaiba Mixture, (Lafayette's).

	Cc.
Copaiba	125
Spirit of nitrous ether	125
Compound tincture of lavender	125
Solution of potassium hydroxide	30
Syrup	300
Mucilage of acacia, a sufficient quantity to make.....	1000

Thoroughly mix the copaiba with the solution of potassium hydroxide ; to this add sufficient mucilage of acacia, to make 450 Cc., and the syrup. Mix well. Finally add the compound tincture of lavender and the spirit of nitrous ether and carefully mix the combination.

The Chair stated that this matter was open for discussion, but suggested that he thought it was one that should probably be brought to the attention of the Committee on National Formulary for consideration. Mr. Hynson said he had already consulted the Chairman of this committee, and he said he would be glad to have it brought before the Section on Education and Legislation.

Mr. Motter moved that this subject be brought before the Committee on Editing, together with the discussion that might take place.

This motion was duly seconded.

Mr. Taylor said that while he did not know anything about the peculiar hieroglyphics produced here, he did know something about problems of editing, and he could see a great deal of horse-sense in the proposition presented. It was exactly in line with the proposition that had already been brought before the Association, as to the necessity of concerted action along this line, and he thought if the presenter of this paper would briefly draw off the items he had presented, as he had explained them, it would be very helpful to the Committee on Editing.

Mr. Hynson said he would like to call particular attention to the use of

capitals in the text of the National Formulary, and also of the Pharmacopœia. He said that, to him, had been one of the most disturbing things he had to contend with, when looking at the National Formulary or the Pharmacopœia, this thing of so many capital letters, as it diverted the attention from the substance of things.

Mr. Payne explained this condition from the fact that these formulas were gotten up by different men, and passed upon by different committees, and it was only natural that there should be some variance in the working and arrangement of the different formulas. Referring to the first formula named by Mr. Hynson, he was free to say he preferred the word "Bromide" written out each time, as given in that formula, rather than the use of the ditto-mark. He thought it would be especially desirable to have the name spelled out, where any matter of this sort came before the court. He thought the section was likely to devote a lot of valuable time to this subject, that might be more profitably used otherwise.

Mr. Apple said he thoroughly agreed with Mr. Hynson as to leaving off the letters "U. S. P." after the name of the ingredient. If the student was not sufficiently conversant with the composition of a drug where it was official, he thought it was certainly a reflection upon the institution that turned him out as a finished scholar; that it was a great reflection on his *alma mater* if he did not know that tincture of vanilla, for example, was a U. S. P. product, and not an N. F. product. He doubted the advisability of using ditto-marks, however, and preferred that the name of the drug be spelled out, as it was only a question of typesetting, and it made it very clear and left no possible question as to what was meant.

Mr. Good agreed with Mr. Hynson as to the use of ditto-marks and the dropping of capital letters, as he had likewise been annoyed and diverted by the profuse use of capitals.

The Chair stated that if there was no further discussion on this matter, it would be referred to the Editing Committee, to report on at the last session of the Association in general session, to which it was empowered to report.

The motion was so put and carried.

The Chair called on Mr. Pritchard to report on the resolution referred earlier in the session to the committee of which he was chairman, Mr. Pritchard made report as follows:

Resolved, That this Association recommend that the Foods and Drugs Act be amended, so that a suitable poison label be placed upon all packages of proprietary remedies containing toxic drugs, in every case where the bottle, box or container holds a toxic dose of any of its ingredients.

Mr. Emanuel referred to the peculiar fact that in Russia alcohol was labeled "Poison," and when the ignorant peasant saw the skull and cross-bones he immediately grabbed for the bottle. He thought this tendency

ought to be avoided, and that the use of the word "poison" should not be cheapened. He would favor the statement that all proprietary medicines containing toxic drugs should bear a statement on the label of the quantity of that medicine which would be fatal to adult human life, without placing a poison label on it.

Mr. Roe, of Indiana, expressed the opinion that the word "suitable," covered the case.

Mr. Pritchard ventured the assertion that no committee could be appointed which could draft a law, or present an amendment to a law, which would cover every idiosyncrasy of every individual.

The Chair agreed with Mr. Roe that the use of the word "suitable"—"suitable poison label"—was broad enough to cover this proposition.

Mr. Apple objected to the idea of "tinkering" with the Food and Drugs Act, and thought if anything was desirable along this line it would be better to secure it by way of an independent act, and not as an amendment to the present act.

Mr. Motter, referring to Mr. Pritchard's statement that it would be impossible to draft a law that would meet with the approval of everybody, everywhere, said that in his opinion, there was too much law. There was too much of a disposition on the part of many people to think, when a thing did not go to suit them, that they must rush off to Congress or their State Legislature and have some law enacted, or some law amended, to accord with their peculiar views. He considered the present National Food and Drugs Act as a fairly good one, and it was still on trial, as it were, and it would very much complicate matters to have it amended. The act was being generally criticised now for its stringency in certain directions. He did not believe the danger arising from the use of these drugs was commensurate with the disadvantage which would follow from making the word "poison" so general in its application to drugs as to cause people to be careless in their use. There were very few proprietary or non-proprietary preparations which were not dispensed in sufficiently large proportions to constitute a poison if the entire package were taken at one time. But, on the other hand, if the use of the word "poison" was made very general, the public would come to disregard it, whereas, as at present understood, it had a clear, definite meaning in the public mind. He did not believe it was desirable to undertake to pass any amendments to the Food and Drugs Act which were not imperatively required, because there was danger of having it injured, instead of improved. As Mr. Bode-mann had said, in a paper read before this Section, it was good policy not to try to improve a law, unless it was reasonably certain that it would not be made worse by the effort.

Mr. Gammon agreed with Mr. Motter that it would be a mistake to tamper with the Food and Drugs Act. He thought there was nothing which cheapened a society or organization as much as too much legislation, and he hoped this resolution would not prevail.

Mr. Cliffe reminded the members that the committee had acted on the positive instruction of the Section to bring in a resolution which met with the views of the Section as expressed in the discussion which had occurred yesterday on this very proposition, and they had attempted to do so. He said if it was the wish of the members not to adopt the resolution, they had a perfect right to do so, and that the committee had no prejudices in the matter.

Mr. Good asked that the resolution be re-read, and this was done by the Chair.

The Chair stated that the effect of this resolution was, that if a package of a proprietary remedy contained enough of a toxic drug to kill a person if the whole package were taken, such package should be labeled with a poison label.

Mr. Payne said while he agreed with the principle of the resolution, and thought it was excellent, yet if an attempt was made to apply it in a legal way it would bring a great many complications.

Mr. Pritchard called attention to a paper read by Mr. Kebler at the Louisville Meeting of the N. A. R. D., in which he spoke of the fact that while all the States were attempting to put a stop to the use of habit-forming drugs by legislative enactment, there were numerous concerns advertising alleged "cures" for such drugs, which examination showed contained large quantities of the very drug they were professing to cure the use of; and that a number of people had found when they resorted to these "cures" that they became worse, instead of better—that they were "actually furnishing the fuel to keep the fire going." He said that Mr. Kebler's idea in his paper before the Section on yesterday was to call attention to the fact that these preparations were being distributed all over the United States.

Mr. Mayo said he did not think the remarks of Mr. Pritchard were germane to this particular resolution. He thought the Cullom Bill or the Foster Bill, so far as the Government was concerned, would cover this question of interstate sale of narcotic and habit-forming drugs more effectively than anything that could be done by this resolution.

Mr. Taylor asked if he was correct in the understanding that Mr. Kebler had discussed this matter as the result of his personal experience. The Chair responded that he was sorry Mr. Kebler was not present to speak for himself, but he did not think his intention was to make the matter quite as broad as it had been made in this resolution; that he thought his purpose was to make it apply more specifically to certain instances which had come under his observation.

Mr. Taylor then proceeded to discuss the situation in New York, and said the present pharmacy law required that all poisons be labeled. He expressed himself as favoring the proposition that proprietary remedies containing poisons should bear a poison label, as well as others. He sug-

gested that the subject might be referred to the Committee on Legislation, and let them thrash it out in detail.

Mr. Engstrom read the section of the Massachusetts law bearing on this subject. He said the word "poison" was not used, but the name of the preparation was given.

The Chair said he thought this point was covered in the Cullom Bill.

Mr. Emanuel offered as a substitute for the resolution that the Committee on Legislation be instructed to draw up a bill and present it to Congress, prohibiting the sale of all proprietary medicines containing toxic drugs, which did not bear a statement on the label as to quantity which was fatal to adult human life.

Mr. Good here made a remark which seemed to strike the members with great force. He said he did not see that this matter had been improved a particle as the result of all the discussion upon it, and he was satisfied that the Section could not reach a conclusion that would be satisfactory, and he therefore moved to lay the whole matter on the table.

This motion was seconded by half a dozen members and carried unanimously.

The Chair stated that the time had now come to have the symposium arranged for on examination questions, and that there were three papers to be presented before the Section on that subject, and then the matter would be open for discussion. The first paper was one by Mr. Sturmer, of Indiana, and he asked him to present it.

Mr. Sturmer read his paper as follows :

THE BOARD EXAMINATION: ITS INFLUENCE ON PHARMACEUTICAL EDUCATION.

BY J. W. STURMER.

For generations scientific workers, like the marine zoophytes which form the coral reefs, have been heaping fact upon fact. Thus a veritable mountain of facts has accumulated in every branch of science. No man can now make all knowledge his province, nor indeed all science.

As knowledge accumulates, it becomes more and more necessary that the process of learning, like that of food assimilation, be a selective process. Teaching a science subject therefore involves helping the student to make a judicious selection from the great wealth of material at hand. The object is not the attainment of the largest bulk of knowledge in the shortest time, but the attainment of the serviceable with the rigid exclusion of the useless. In practical life we find that a man's proficiency is not at all commensurate with the extent of his learning; and that, indeed, an efficient mind is a workshop rather than a storehouse. True, to do things one must have certain knowledge. But much of the knowledge which the old-time business man endeavored to keep in his head, the modern business man keeps in a card index or in a filing case. And in like manner,

much of the pharmaceutical lore might just as well be kept in book form, and repose on some handy library shelf until needed. When the business man adopted the card index and the filing case, he became vastly more capable. When the pharmacist gets over the notion that he must be a walking dispensatory—when he discovers that a mind can become so clogged with knowledge as to impede its functioning as a thinking organ, and learns to use reference books for reference—he also becomes vastly more capable. And as for education, the greatest discovery made in pedagogics was the discovery that the mere acquisition of facts and data did not constitute education. This applies to a pharmaceutical education as well as to any other.

In General Chemistry the instructor is now particularly concerned with principles and fundamental laws. More time is devoted to the theories of dissociation and of mass action, and less to such matters as the percentage composition of brass. An examination of the catalogues of our universities shows that General Chemistry courses are now in the main philosophical rather than descriptive. Details and mere facts not needed to shed light on laws or principles are not memorized, but are obtained from reference books as occasion arises. These remarks, with modification, apply to pharmacy as well.

Now I would not be understood as favoring the abolishing of all memory tasks. Nor even to restrict memorizing to the memorizing of laws and principles. I would memorize some facts; even a goodly number; but I would differentiate between facts which may help toward generalizations (helping to explain other facts), and facts uncorrelated, and valuable for their own sakes. Of the latter group pharmacy students should commit to memory only those facts which are required frequently in every-day work, and which when needed are needed promptly, as, for example, the doses of the common toxic drugs. But why students should be required to memorize names and data which might possibly be needed sometimes during their lives, but which in all probability will not, is a mystery to me. It seems such a waste of mental energy. Suppose our geography teachers had insisted that we learn the names of all the rivers, cities and hamlets in the Philippine Islands, in China, in Manchuria and in South Africa: and on the ground that at some future date wars might be fought in those distant lands, in which event the geographic names would be of assistance to us in following the campaign. Now, as a matter of fact, those wars were fought; we did follow the campaign; and with the help of maps got along passably well. In like manner we could get along passably well if many of the facts, near-facts, and fancies, which we memorized in our student days, had been left undisturbed in the text-books, to be looked up when needed. The average materia medica course includes something like 10,000 to 15,000 items to be memorized by students. No one can convince me that all this junk is of use in every-day work. Why should a

student—to cite only one example—be required to learn that in *veratrum viride* may be found jervine, rubijervine, pseudojervine, proto-veratrine, veratroidine and cevadine? There is only one reason why a student, knowing that such knowledge, or pseudo-knowledge, is absolutely useless to him in his life-work, will study such matters; and that is that he must pass his examination. And there is only one reason why some teachers insist on the memorizing of items of the aforementioned type: they presume (and on good grounds) that such knowledge may be required on a State Board examination. It seems that some State Board examinations are still based on the erroneous assumption that a candidate who has acquired a lot of out-of-the-way knowledge must needs be well versed in useful knowledge. That if he can give the botanical name of the plant on which grow jequirity seed, and can talk glibly of igasuric acid, he must be particularly well informed concerning those things which are of use in every-day work. Such reasoning is most fallacious. If a teacher in his own examinations deals with the remote, the insignificant, the unusual, his students soon "become wise," and give but scant attention to the important and the useful, emphasis in teaching notwithstanding. In other words: students can in a given time learn only so much; if they devote time to the useless, they will acquire that much less useful knowledge. This is axiomatic and needs no proof.

Some teachers deprecate that students generally seem to be so anxious to pass as to willingly forego the useful for the useless, if they expect the latter to be of assistance to them in the examination; so they advise their students against making special preparation for the State Board ordeal. Such advice may, under certain circumstances, be sound enough, but as far as I know, is never heeded.

This paper carries an implied criticism of State Board examinations. But it is not directed against State Boards in general, nor against the board of any one state in particular—it deals with general propositions.

Unfortunately a member of the Pharmacy Board does not, like the teacher, hold his position for a long period of time. When the examiner has acquired experience, and is beginning to do efficient work, he may be replaced; and not by an understudy, but by a man who has had no experience as a teacher, is not cognizant of the trend in pharmaceutical education, has no clear ideas as to educational standards, and is not familiar with approved methods for the sampling of a man's knowledge and ability—a sampling more difficult than the sampling of an ore, of a soil, of a lump of opium, or of a bale of drug (concerning which much good advice is freely offered in text books).

So to the younger Board members I submit this paper for consideration. I have tried to set forth the following:

1. That not only is the nature of the state board examination reflected in the curricula of some colleges, but also determines to a great extent the

attitude of students toward different branches of study in all colleges of pharmacy.

2. That the energy candidates expend in special study as preparation for this test before them, is in the aggregate astonishing as to amount.

3. That much of this energy is expended upon the unusual and impractical questions, which fortunately are becoming fewer each year, but which still exercise a most pernicious influence in disturbing students' ideas as to what is worth while in pharmaceutical education.

4. That in pharmaceutical pedagogics we are placing more and more value on assimilated knowledge, as against knowledge in original packages; and that unless State Boards do likewise, they are bound to encourage quiz-compend study as against true education.

5. That the questions which encourage true education are also the questions which determine the candidate's real ability; and that the questions which call for the remote or curious or for text-book definitions, fail utterly as tests, and bring about the rejection of some of the ablest, and the passing of some of the least able of the candidates.

The board which has solved the problem as to what constitutes a real and just test by which candidates may be separated into competent and incompetent, has also solved the question as to how true education may be encouraged, and the spurious be discouraged. Pharmacy has no truer friend than such a board; nor has the pharmaceutical educator an ally more valuable.

Upon motion here by Mr. Hynson, the Presidents of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties were invited by the Chair to take seats upon the platform.

The Chair said he was sure the members would agree with him that the Section had a treat in store in the series of papers of which Mr. Sturmer's paper just read was a type. He then called on Mr. Arny to read his paper on the subject of examination questions.

Mr. Arny presented his subject as follows:

BOARD EXAMINATION QUESTIONS.

BY H. V. ARNY.

The symposium on board examinations, which appeared about two years since in the Druggists Circular, and also the series of papers on the same subject published during the past year in the Midland Druggist, seem to cover the matter so fully that the writer would not have had the temerity to occupy the time of this Section with his views on board examinations, except in response to a request from the Chairman of this Section for a paper on this topic.

The invitation was accepted chiefly to start, in this representative body,

a discussion as to the scope of board examinations, with the hope that such discussion may lead to progress in this particular field of pharmaceutical endeavor.

Without taking the time to go into details as to previous papers on the subject, the formerly-expressed views of the writer can be summarized in a series of questions.

I. *What constitutes an ideal board examination?*

This question can best be answered in the words of Dr. Whelpley (Proceedings A. Ph. A., 1905, 140)—“questions which any competent pharmacist can pass without any special preparation.”

II. *Do any of the present board examinations come up to this ideal?*

The best answer to this is an incident told the writer by a member of a board who said that a recent examination was tried by a man of sixty or over, a former registered pharmacist who had engaged in other business, allowed his registration to lapse and now after a decade or more in other lines, desired to take up his first love. He reported that the examination did not bother him much beyond questions relating to the present editions of the Pharmacopœia and National Formulary; that he had done little by way of “boning for exam.” When the papers were marked, it was found that this man came out second in a good-sized class.

III. *What kind of questions could a competent pharmacist answer without special preparation?*

To paraphrase a previous article (Druggists Circular 1909, 59) questions demanding among other things ability to think; acquaintance with pharmaceuticals, especially with view to proper dosage; knowledge of sufficient chemistry to foretell incompatibility, to distinguish chemicals by simple tests and to calculate molecular proportions; comprehension of materia medica covering constituents, doses and such individual peculiarities as count in selection or preservation of drugs; and, above all, a thorough conception of the prescription and of the many responsibilities that come to the dispenser.

Much is said these days relative to superiority of ability to reason over the memorizing of concrete facts, and with most such statements, the writer is in hearty sympathy. But as any good thing can be over-done, even so there is danger that we, in our zeal to increase the reasoning ability of future generations of pharmacists, may forget that the possession of quite a number of facts is essential to the successful man in any calling. To quote a previous article (Druggists Circular 1910, p. 185): “There is a tremendous number of facts that should be learned by students, despite statements to the contrary on the part of those of our teachers who promulgate the doctrine, that learning should be a plethora of observation and a paucity of memory work, and I venture to go so far as to say that the reason some of the exponents of this idea are great, is because their minds are stored with information beyond their fellows—and that gotten

as much under the midnight lamp as in the laboratory." But, on the other hand, an examination jammed full of facts is an abomination. Imagine any of us sitting down to answer such a question as :

"What is the solubility in alcohol and water of (a) boric acid ; (b) gallic acid ; (c) tannic acid ; (d) lime ; (e) hydrated chloral ; (f) codeine phosphate ; (g) codeine sulphate ; (h) corrosive sublimate ; (i) epsom salt ; (j) terpin hydrate?"

If the intent of the examiner is to get the answer "insoluble," "sparingly soluble," "soluble" or "very soluble," the question is reasonable ; but in cold black and white the question reads as if intended to ask for the exact number of parts of the solvent in which one part of the chemical dissolves.

This question of the "intention" of the examiner is another potent factor in the success or failure of the candidate. Recently there was submitted to the writer by a friend on a board of pharmacy, a set of questions which had wrought havoc in the class to which it had been submitted.

The highest made was 43 per cent. and the lowest 13 per cent. ; while on the other branches excellent percentages were made ; for instance one man made 95 per cent., 84 per cent. and 76 per cent. in three other branches and only 29 per cent. on the set of questions submitted. As an examination of the questions showed, that while the questions were difficult, they were not unreasonably severe, they were submitted as regular test to the writer's senior students with the result that of the twelve sets of answers, seven made over 70 per cent. ; one man making 89 per cent.

The obvious conclusion was, that either the examiner's marking was too severe or the writer's too lenient.

The enthusiasm of the writer for examination made up exclusively of reasoning was dampened by the sudden appreciation, that while this may possibly be the ideal to which we should seek in some golden future, it does not fit the mentality of the present-day pharmacy student. In a previous article, the writer expressed his opinion that an examination could be devised consisting of prescriptions only, and yet including every branch taught in a school of pharmacy save microscopy and urinary analysis. Such an examination he tried last year with slaughter incredible, the only thing saving the boys being their good yearly averages. That the boys were better than the average was shown by the fact that all save one easily made the subsequent examination of the State Board of Pharmacy.

Speaking as an individual teacher, the problem is to get the boys to think and for this reason, the Board Examiners can find no better field for improvement of the quality of candidates than a wise and gradual increase in the number of reasoning questions.

IV. How can board questions be improved both in quality and uniformity?

This can be accomplished, as has already been suggested by others, by the establishment of a Central Question Committee, appointed by the National Association of Boards of Pharmacy, and consisting of members of the boards; this central committee to ask contributions of questions from all interested, (notably from board members and from teachers) the task of the committee being to group these questions into harmonious sets. A set of these questions constituting the scope of the average board examination to be furnished to all the boards going into the plan, and used by these boards on the same day; this making a union interstate examination similar to the union college-entrance examinations, which prevail in the northern section of our country. Such a plan would not only insure uniformity, but would also largely contribute to solve the vexatious problem of interchange of certificates.

As to objections to the plan, several men of straw could here be erected and immediately knocked down, but it is deemed wisest to answer outside criticisms, rather than those of the writer's own making.

The Chair called for the third paper of this series, one by Mr. Kalusowski, of Washington City, and that gentleman presented his subject as follows :

ON SOME DEFECTS IN EXAMINATIONS.

BY H. E. KALUSOWSKI.

The methods of examination of students of pharmacy as they are usually followed are not satisfactory nor conclusive : they cannot be criticised upon either the scope or variety of questions ; they are open to criticism, however, upon what they often fail to disclose, which is, the measure of a student's attainments. The conclusions that are drawn from the answers given in a written examination are sometimes far from being correct. A student possessed of the faculty of memorizing, and with a fair ability to transpose his recollections to paper, will answer a series of questions in such a manner that his answers will receive high ratings ; yet the same kind of a student in a dispensing department of a pharmacy will not always prove satisfactory ; the inefficient character of his work and his inability to apply the fundamentals of pharmacy so as to produce the best results are frequently in evidence.

There is another type of student. The rating given to his written answers has just earned him the passing mark, his style of composition is labored in the expression of ideas, and as a result what he wishes to convey in his answers is somewhat obscure, differing from his more brilliant colleague, whose answers read as if they had been transcribed from a text book. Turning for comparison, to their work in laboratories, it is found that in the general result there are some differences. In the case of the first student we find as a rule his work is done rapidly ; apparently it has been well done. A closer inspection soon makes a decided impression that some-

thing is wanting ; checking up his work, it is soon found that many things are deficient. This feeling is absent when the work of the less brilliant student is inspected. There may not be quite as much accomplished, but what is done appears to be well done, and when closely inspected it leaves an impression of completeness.

The two extremes are taken to illustrate the fact that in an exclusively written examination we have to deal with this condition : that from some students endowed with a fair amount of the faculty for memorizing and some ability to fairly well transpose upon paper what they have memorized, the examiner will receive an excellent paper and the answers will be rated accordingly. In the other case we have to deal with a student who is not gifted with any great amount of the faculty for memorizing. His tendency is to arrange his mental stock in some kind of order and draw upon this to work out an answer to the question before him ; his faculty for transposing his conclusions upon paper is not very good ; he has not the gift of writing, yet we find in the sometimes obscure and frequently defective methods of expression evidence that he has reasoned out his answers. But as the written examination has been made the final test of their respective attainments, the examiner is placed in the position where a rating, high or low, is given to a paper, which, in many cases, does not indicate the actual attainment and ability of a student. Another condition which impairs the value of a written examination is the wide difference in the character of the answers made by students having apparently the same degree of attainment. While this is altogether a personal condition, it is a condition that is difficult to consider and one which necessitates much thought in the rating of answers. A nervous student will, as a rule, show a falling-off in his answers as compared with a phlegmatic, unemotional student. In a written examination extreme nervousness on the part of students is a frequent occurrence. The thought of having to write answers to a given number of questions and complete them within a set time seems to unnerve some students to that degree where they apparently become incapable of doing anything.

Oral examinations are less trying to this class of students. It is an easy matter for the examiner by words of encouragement to give a nervous and merely demoralized student a feeling of comparative ease and restore confidence in himself. An oral examination, while it offers some advantages, is open to this objection, that it is difficult, in fact impracticable, to arrange a series of questions for any considerable number of students which will be of equal educational value and in which each student is placed on exactly the same level, as is obtained by a written examination. In this respect a written examination has the element of equality.

A laboratory examination that requires the compounding of a series of formulas has this value, that it will bring out what theoretical knowledge a student has acquired ; it will also serve as a test of his efficiency in putting

his acquisitions into results. It may be urged against the value of a laboratory examination, that it is possible for a student to acquire a certain amount of a kind of mechanical knack by which he can after a fashion compound a formula without knowing much of the fundamentals of pharmacy. No one will deny that there is force in this objection; it is, however, an easy matter to select formulas of such a character that unless the student has a good knowledge of the art of pharmacy and is well grounded in chemistry, he cannot with all his "rule of thumb" practice produce a satisfactory result.

A laboratory examination, restricted to a limited number of formulas which have been selected because they require a knowledge of the theory and practice of pharmacy, is, in conjunction with a written report explaining and describing the methods followed to produce results, of much value. Among other things which may be said in favor of such an examination is that it is more evenly balanced, and a nervous student is soon set at his ease, any defects in his ability to compose written answers which would otherwise be exaggerated through his self-consciousness being in a measure overcome or forgotten during his absorption in practical work.

While a final test of some kind, written, oral or practical is indispensable, such a test, whatever it may be, should take into consideration the records made by the student during recitations, and the character of his work in the laboratories, as to whether the work has been well done, giving due credit for neatness and celerity. Notice should be taken if his work was done by an orderly application of principles, chemical and pharmaceutical, involved in the processes, or whether it was simply intended to report a large quantity of work done without regard to the final character or condition of it.

A laboratory examination confined exclusively to the preparation of a number of formulas is without great value unless it is accompanied by a written narrative of how the work was performed and why certain things connected with the work were done. With this form of examination the examiner is placed in a better position to pass upon the qualification of a student. That there are inherent defects in any system is admitted but by some such combination as that mentioned it is believed that it will show the general deficiency of the student and give less prominence to the faculty of memorizing.

A defect of another character common to written examinations is frequently found in the selection and grouping of questions and at times some obscurity in their phraseology by which the scope of the question is not grasped by the student.

A block question with its subquestions should be so worded as to leave no doubt of its meaning and should be confined to one topic and not cover a series of unrelated subjects, and the subquestions should be arranged in a systematic order so as to cover the chief points of pharmaceutical in-

terest in the topic selected. A question arranged upon such a plan generally places difficulties before those students who have memorized more or less of the contents of a quiz compend. The following types of questions will serve as a fair illustration :

How is Ferric Chloride Solution prepared?

What are its physical characteristics?

How much Iron will be required to prepare 125.00 grams of the official solution?

By what tests can it be shown that Nitric Acid and Ferrous Iron are absent?

How is the official Tincture of Ferric Chloride prepared?

Why is it directed to keep this preparation for three months before dispensing?

Name some of the common incompatibilities with the Tincture and state how they are manifested?

What is the dose of the Tincture and how should it be taken?

A block question of this character will fairly well exhaust one topic, and if a student answers it correctly or seventy-five per cent. correctly it may be assumed that he knows something about that particular subject.

In a practical examination the object should be to ascertain his familiarity with proper methods of dispensing prescriptions and compounding formulas so that their intended therapeutic effects should be presented in their fullest efficiency. The skill of the candidate in a practical examination should not be tested by a series of formulas whose chief characteristic is their heterogeneous composition which frequently admit the concealment of defective manipulations, but by formulas for compounds usually dispensed, such as emulsions, pills, solutions and ointments—mixtures should be omitted. Under emulsions two types are available, one with either a fixed or volatile oil with a syrup and hydro-alcoholic fluid; another type would include an emulsion of some fixed or volatile oil or a mixture of both and to contain some solid substance such as salol in a vehicle of syrup and water. Under pills, a mixture of salol, quinine and acetanilide or other bodies without any adhesive qualities; the formula should not indicate any more than that the pills when ready for dispensing are to be white and not bulky. Volatile oils and oleoresins may be ordered in pill form without indicating excipients.

Formulas for solutions should be such that some knowledge of chemistry is necessary to compound them. A formula of this type while simple is generally a fair test: Of salicylic acid, bicarb. soda and water, a colorless solution is required: Tincture of nux vomica fl. ℥iv, potassium iodide ℥ij, mercuric chloride gr. ij, water enough to make fl. ℥iv; a solution without any precipitate is required. In the choice of ointment it is always well to select some compound that contains several incompatible substances and indicate the quantities in percentages, such as for example in

the following "Make half a troy ounce of a smooth ointment using benzoated lard as the base which will contain 5 per cent. ext. opium, $3\frac{1}{2}$ per cent. tannin and 1 per cent. lead acetate," or a formula may be submitted for an ointment to contain a soluble salt and a fat with lanolin.

A test of the student's knowledge of weights and measures can be brought out by something like the following. Prepare two fluidounces of an aqueous solution of mercuric chloride so that when three fluid drachms are added to 500 Cc. water the mixture will make a $\frac{1}{4000}$ solution of mercuric chloride.

When suppositories are included, besides some ordinary incompatibility such as may occur between extracts that contain tannin and those that contain alkaloids, weights of finished suppository should not be given; the formula should only say use sufficient oil of theobroma to make so many rectal suppositories U. S. P. weight and dimensions.

These examples are given to show the object in view, which is not to confuse a student of the average ability by presenting him impossible puzzles but by giving him something to reflect upon and bring into play his knowledge of the theory and practice of pharmacy.

Upon the completion of his practical work properly labeled with identification mark or symbol he should write a brief account stating what plan and order he followed and give a reason for each step that was taken; if the formulas called for metric quantities he should be required to give their equivalents in apothecaries weights and measure.

By a combination of this kind, and a written examination confined to a certain number of topics, the examiner can according to the results he obtains form a just conclusion regarding a student's qualifications, and a student otherwise satisfactory but deficient in ability to transpose his thoughts to paper is placed in a position where this deficiency is more than balanced when he can give a manual proof of his knowledge. A combined examination of this character, while it is far removed from perfection and has some of the defects that are inseparable from any test of ability which depends upon a student to show in a restricted period of time and under conditions which he feels are unfavorable to him, will prove a fair measure of his attainments.

It can be said of this plan that it is in its general results more evenly balanced and only operates disadvantageously to the student who depends upon qualifying himself for his examination by two or three week's cramming with a quiz compend.

The Chair announced that these three valuable papers were now open for discussion.

Mr. Mason opened the discussion, and began by saying that State Board examinations comprised one of the most important subjects that could possibly be discussed, for upon proper examinations depended the character of the men who were admitted to the ranks of pharmacy. It was also a

subject fraught with great difficulty. During the last two or three years, he said, the journal with which he was connected had been, so to speak, endeavoring to pass different State examinations, as some of the gentlemen present knew; that it had been printing the board examinations and answering the questions itself. He himself had not done this work, but one of his assistants had been preparing these answers, and he had kept in close touch with the work. He had found, as Mr. Sturmer and Mr. Arny had pointed out, that the great majority of questions asked by boards of pharmacy were immaterial, and not of a character to test the real ability of the candidate. As Mr. Sturmer had said, every careful pharmacist should know by memory the dose of morphine, opium, and things of that kind; but behind the prescription-counter, when a prescription was presented, or when a formula of the U. S. P. was to be dispensed, he thought surely it would not be expected that the pharmacist should do this work from memory, but would naturally depend upon the reference-book. He agreed with the writers of these papers that the thinking and reasoning powers of the student, based on his knowledge of the fundamental principles of pharmacy, chemistry and allied sciences, should be developed, and questions should be asked which would bring these qualities into play. This was not the case with the examinations as ordinarily conducted. Mr. Mason admitted, however, that it was very difficult to say just what form such examinations should take. Even in the case of careful educators, where they had had a student under constant surveillance for two or three years and were familiar with his personality and work, it was difficult to draw up an examination to test the real efficiency of the student. And if the teacher, who was accustomed to test students, had this difficulty, naturally it must be accentuated with the Board of Pharmacy, whose members knew nothing of the personality of the applicant, and were called on to test the efficiency of perhaps 50 or 60 men at one time.

Mr. Mason went on to say that he had been much impressed with the recommendation of Mr. Arny that a central committee be created to draw up a model examination for use by boards of pharmacy. This was not a new idea, but he considered it a timely one. It might be that some members of the boards would fear to lose their individuality by this plan, but he thought the idea was well worth trying. But why not go a step further, he asked, and have a joint committee, appointed from the Conference of Faculties and the Association of Boards, thus giving the teachers "a whack at this thing." The boards and the colleges were getting together through the syllabus and in other ways, and the future of pharmaceutical education was largely dependent upon such harmonious and co-operative action. He thought such a joint committee would be peculiarly fitted to draw up a model for board examinations. He did not mean that the board should be bound by such action, but it would be at least of some suggestive benefit, and have some educational value. He was firmly convinced that the

average State Board examination was not what it ought to be, and must inevitably lead, as Mr. Sturmer had pointed out, to the frequent rejection of really good candidates because they could not answer questions asked about obscure and inconsequential matters, while the "crammers" of the quiz compends would sail through with flying colors.

Continuing, Mr. Mason passed to another phase of the subject, and said he believed that Board examinations should, so far as possible, duplicate the actual conditions in the store. He thought, therefore, that practical questions ought to be asked by the Board, and that the practical examinations which had been conducted by the Boards in recent years were a step in the right direction. "Give a man a book and everything else he needs," said Mr. Mason. "Don't leave him helpless, and relying solely on his memory to solve a problem presented to him, but give him the books, and put questions to him so that he will not have to look up isolated facts, but call on his powers of reasoning and his knowledge of pharmacy."

Mr. Engstrom was the next speaker, and started out by saying that as the professors had had their inning, and the press theirs, he thought the Boards of Pharmacy should have something to say in regard to the subject of examinations. He said the Boards had been discussing examinations in much the same manner as the suggestions that had been offered here, and that he could go further and say that the Boards were trying to get so near together that every State would, in its examination, pay due regard to the three points that had been emphasized this morning as necessary to determine the ability of a man to be a pharmacist in any State in the Union—the three methods of examination, written, oral and practical work; and that the majority of the States belonging to the Association already had this feature. Referring to conditions in Massachusetts, Mr. Engstrom said that in the report of the State Board to the Governor they gave a statement or outline of the examination required. He then proceeded to read at length from the regulations on this subject prevailing in his State, showing how the attempt was made to get at the candidate's real knowledge, rather than test his memory merely. He gave some illustrations of the character of questions asked, and related some experiences showing where the student could memorize the words of the *Pharmacopœia*, but could not put the meaning in concise form of expression, because he had not been trained to think. Mr. Engstrom said the Boards generally were doing all they could to eliminate quiz compends and to get at the real facts as to the candidate's knowledge, so that they would know when the candidates were passed that they were safe to be placed in charge of drug-stores in their respective States.

Mr. Hynson asked Mr. Engstrom if he had any statistics regarding the number of failures before and since the adoption of that standard, and Mr. Engstrom replied that this was a matter that depended largely on conditions, and there was very little difference, he thought. He said that

they had had thirty examinations last year, and he did not believe any college professor was called upon to read thirty examination papers, with the numerous questions involved. To write out these 30 papers required a great deal of thought and carefully going over each question, to avoid criticism by the outside world, and by the students themselves.

Continuing, and referring to the proposition to have the National Boards submit a form of questions, Mr. Engstrom said he did not regard this as practical, for the reason that the Boards of the respective States must take into consideration the environment of the student that came up for examination. For instance, in certain States they had a prerequisite law applying to college graduates only: a man must be a college graduate before he came before the State Board for examination. But in the majority of States that requirement did not exist. He thought these questions must be prepared to make a fair test of the candidate, and the Board should be careful to see that the questions asked were not so high above the heads of the boys that they could not cope with them; they should be given a chance to pass. Mr. Engstrom likened the Board to a sort of national balance-wheel on this subject, as between the different States. Recurring to conditions in Massachusetts, Mr. Engstrom said that 491 applicants were before the Board last year, in 30 different examinations, and that 125 of these had been passed as registered pharmacists, 198 as assistant pharmacists, and 168 failed. Under their system, if the candidate for full registration did not attain 75 per cent. on his examination, he was granted an assistant's certificate if he attained 60 per cent. There had been a great demand for drug-clerks in the State, and the law allowing the giving of assistant pharmacist' certificates was passed to relieve this situation.

Mr. Payne said he had listened with a great deal of interest to the papers read, and the discussion up to this point, and he felt that a great deal of valuable information had been given, but there was one point that had not been brought out, and that was the limited time the State Board could remain in session, and the limited number of questions that could be put—especially in dealing with a large number of candidates at one time—as had been his experience in Georgia in the fifteen years of his service on the Georgia Board, where there had been as many as 120 candidates before the Board at one time. No Board wished to ask so many questions that it was a hardship on the mental endurance of any young man to take the examination, nor was it desirable to have the examination so long that it would be a terrific physical strain on the examiner who marked up the papers in the limited time available. The item of expense to candidates was another thing to be considered. It might be easy enough, he said, to take a single candidate and find out what he knew in a short time, and perhaps with but little questioning; but when an examination paper was gotten up for 120 men, to find out what they all know, it became a very serious problem, and one that required a great deal of

thought and care. His experience had been that there were certain memory questions that should always be asked, to develop the applicant's knowledge concerning certain things, that every one should know.

Mr. Hynson, speaking of Mr. Kalusowski's paper, said there was a wide difference between the man that was good on technique, but had no real mental equipment, and the really qualified man, and said his experience had been that if a man had mental capacity to stand well in chemistry, materia medica and the theory of pharmacy, he was almost always a good practical man, whether he had drug-store experience or not. He was opposed to too much practical work in the examinations, as the conclusions drawn therefrom were liable to be erroneous. It was impracticable to assay each pill, for instance, and too much reliance should not be placed on this feature of examinations.

Mr. Flemer said he wanted to indulge in a little retrospection : That he had had four or five years' experience on boards of examination, and he had reached certain conclusions that he thought it would be well to speak of at this time. He referred particularly to the purpose and scope of board examinations, and said he believed the time would come when such examinations would be, not so much an examination by the board, as by a surveying board. He said the purpose of the examination should be, first, to find out whether the statements with reference to age, practical experience and preliminary education were all fulfilled. He expressed the belief that, in the future, none but college graduates would be capable of passing the rigid board examinations in the more progressive States. Mr. Flemer said their experience with oral examination had not been satisfactory, for the reason that it had gotten them into trouble with the courts. The materia medica examination had usually been conducted orally, but one of the candidates took exception to it, and claimed that the questions asked him were not the same as those asked the other candidates, and he took the case to court and won out ; and since that time the board had not conducted oral examinations in Washington. He expressed the opinion that no man could tell by written or practical examination only, the capacity or incapacity of the candidate. He believed that far more could be discovered as to the candidate's real ability, and in a great deal less time, by a few well-directed oral questions, and it was unfortunate that they were limited to written examinations for the reasons given.

Mr. Mankin said he thought these most excellent papers that had been read before the Section ought by all means to be published, so that other boards and colleges might have the benefit of them. He thought there was an erroneous impression in regard to the boards of pharmacy and the colleges in the suggestion that there was a disposition on the part of the colleges to so instruct their students that they could pass the board examinations. He said he thought the colleges were getting broader and broader in their examinations, and that the boards of pharmacy were

getting closer to them ; and that if more such papers as those presented here could be brought before the members, and the examinations made broader, plainer and more practical, and the college professor brought into examination work, it would be a strong move in the right direction.

The Chair stated that if there was no further discussion, the papers would be received to take their usual course, and referred to the Publication Committee.

Mr. Seltzer, referring to the matter of oral examination, said he thought both systems were very important, and he commended the suggestion of the Massachusetts Board in *giving notice* of what was expected of them as a capital idea, and thought the Boards of other States should take that up.

Mr. Arny here entered an earnest protest against Mr. Mason's suggestion that the school men be represented upon the proposed central committee on examination questions. He said he did not want this done, because everybody knew that the National Association of Boards of Pharmacy had enough capable men in it to deal with this question satisfactorily, without the assistance of the school men on this committee. It was all right if the Boards of Pharmacy wanted to invite questions from the school men, but he was opposed to the latter "dabbling" with it officially, or in their examinations, as it was a matter peculiarly for the Board.

Mr. Mason was equally earnest in his protest against Mr. Arny's position that the teachers should not be mixed up in this matter for political reasons. He said he meant "political" in a broad sense ; that there had been a feeling sometimes that if the teachers were involved they would in some way favor themselves at the expense of the Board. He said he thought these fears were rather exaggerated.

Thereupon, Mr. Mason moved that the incoming chairman of this Section appoint a committee of ten men, five of them to be members of Boards of Pharmacy, and five of them college professors ; this committee of ten to draw up during the year a set of specimen examination questions, to be presented before this Section next year for discussion—simply for discussion and enlightenment—at the joint session of the three bodies now holding this session. He said he did not mean a set of questions necessarily to be used by any Board, but simply to be drawn up for its educational benefit, and as a basis for discussion next year. He thought there could be no possible objection on Mr. Arny's part to having the teachers represented on such a committee. It was especially desirable to have the teachers represented, in view of the present tendency of the Boards and Colleges to get closer together through the Syllabus, and the effort to harmonize things so the Boards would regard certain subjects much the same way the colleges were teaching them.

Mr. Payne offered as amendment to this motion that there be established a system, or some arrangement, to serve as the basis upon which a selec-

tion of questions might be made. The questions themselves would not amount to much, because they could be used but once, whereas a generally understood basis for such questions might prove very valuable and useful.

The Chair suggested that this might complicate matters, and that the best basis of selection would naturally come out in the discussion of the suggested questions before the general *committee*.

Thereupon Mr. Payne withdrew his proposed amendment.

Mr. Taylor seconded Mr. Mason's motion. He said he did not want to discuss this question, but it was one of the "livest wires" that had been touched at this meeting. He expressed the opinion that the teachers who might be appointed on this committee should be teachers who were not also members of Boards of Pharmacy.

Mr. Mason said he would accept this suggestion.

The chair stated that the motion was, that the Chairman of this Section appoint a committee of ten members, five of whom should be members of Boards of Pharmacy, and five of whom should be members of College Faculties and not members of Pharmacy Boards, this committee to report at one of next year's sessions, with a specimen set of examination questions.

And the motion was so put and carried.

The Chair said he would now entertain a motion to refer the papers read to the Publication Committee, in the ordinary course.

A motion to this effect was put and carried.

The Chair called for a paper by Rufus L. Lyman on pharmacology as a curriculum essential, and that gentleman presented his subject as follows:

EXPERIMENTAL PHARMACOLOGY AN ESSENTIAL IN THE PHARMACEUTICAL CURRICULUM.

RUFUS A. LYMAN, DIRECTOR OF THE SCHOOL OF PHARMACY, UNIVERSITY OF NEBRASKA.

I have been requested to express my views upon this subject. I make no claims to the title of a pharmacologist. I wish to be known as a physician interested in both medical and pharmaceutical education. I suppose because of the interest I have manifested along these lines, I was asked a short time ago, to organize a school of pharmacy in the University of Nebraska, where it was felt by both educational and professional men that such an institution was needed in order that the young men and women of our state might receive more efficient pharmaceutical training. My remarks are inspired by my experience as a student of medicine of ten years ago and as a practitioner, and a teacher of medical and pharmaceutical students since that time.

In a former paper, I have quoted the following statement made by Professor J. T. Halsey of Tulane University. "A study of the current and past therapeutic literature will, I believe, convince any doubter who possesses sufficient knowledge to enable him to form an intelligent opinion,

that there is no branch of medical science, other than therapeutics, wherein medical men display a more culpable and harmful ignorance of essential facts than is the case with pharmacology. Without an exact knowledge of the pharmacological action of some, at least, of our important drugs, a physician must become and remain an empiricist, one shooting in the dark with deadly weapons whose range and power are unknown to him,"—a statement every phrase of which every medical man knows to be brim full of truth.

Many have attempted to explain the cause of the present chaotic condition of pharmacology and therapeutics. Medical men everywhere, and in some cases men prominent in the profession, have attributed it to the fact that the teaching of prescription writing has been neglected in our medical schools. In fact, in recent years more criticism from certain sources has fallen to the lot of this minor course than to the whole of the remainder of the medical curriculum. To a medical pedagogue such criticism is amusing. Even in these days of antipolypharmacy the teaching of the elements of prescription writing is necessary and practice in the same is desirable, but one cannot acquire a knowledge of the physiological action or therapeutic application of drugs through any amount of such teaching and practice.

To appreciate the present state of the medical and pharmaceutical sciences and the ignorance that prevails so largely, within the profession it is necessary to recall a few historical facts. As every one knows, historical medicine began with the Egyptians. We infer, however, that medical practice must have begun with the origin of the human race coincident with the liability to injury and sickness. In the beginning the cause of disease was probably attributed to the indwelling of evil spirits. One may reasonably infer this from the fact that it was so believed later in historical times and the belief is still prevalent among savage tribes and semi-civilized nations. Naturally the original method of treatment consisted of prayers and incantations. The making of noises and the application of fire were used to drive out the demons from the afflicted. Material methods of treatment came to be used. By accident it was found that certain chemicals and plants seemed to be of value as means of cure. Curiously enough, the more disgusting and nauseating the substance, the greater was believed to be its potency in the treatment of disease. A materia medica was developed of such a disgusting nature that civilized people must revolt against it. This came in the eighteenth century. The time was ripe for homeopathy. It came. The reaction set in. The pendulum swung to the other extreme and the early years of the nineteenth century witnessed a period of nihilism. The great Skoda (1805-1881) was its most ardent advocate. However, it was he who paved the way for the rational study of pharmacology and therapeutics. He introduced the methods of auscultation and percussion making it possible to

study more accurately the effects of disease and consequently the action of remedies.

In 1817 morphine was isolated by Sertürner. Thus a definite plant product was substituted for an indefinite crude drug. Animal experimentation was begun and gave rise to modern pharmacology.

In a recent article by Doctor Horatio Wood, Jr., entitled, "The Value and Limitations of Physiological Standardization," he points out the fact that pharmacology is a new science, that the first pharmacologist in the modern acceptance of the term, is still living and teaching. He discusses the danger of error in the biological test and shows the necessity of its use in the standardization of certain pharmacopœial products and the testing of the efficiency of others. He calls attention especially to the work done upon digitalis and ergot by Americans and Europeans, of the new methods introduced by Doctor Reid Hunt in the study of glandular products and to the fact, that the problems which the pharmacologist is asked to solve at once, make a herculean task, surrounded by numerous difficulties.

To one who has studied the subject ever so superficially, it is evident the treatment of disease by drugs is to be made rational by introducing into our schools courses in experimental pharmacology. I believe the lack of such training is the greatest defect in our present system of medical education. A student may be very well trained in the fundamental branches of medicine, such as anatomy, chemistry, physics, physiology, bacteriology and pathology; he may be skilled in modern methods of physical and clinical diagnosis and still know nothing about the changes induced in the physiology of the normal animal body by the introduction of drugs, and much less about their use in diseased conditions. For example, as a medical student I remember the importance that was placed upon strychnine as a therapeutic agent. I was taught that it was a tonic par excellence; that it increased all the functions of the body; that it increased the activity of the heart; that, in large enough doses, it induced convulsions; that it was useful in diseases of the heart, in certain digestive disturbances, in emaciated conditions, etc., etc. In a like manner I was taught the physiological action and therapeutic application of a hundred other substances. When I was through with it all it seemed the most unsatisfactory subject in the medical curriculum. If in the beginning I had been given a frog and told to inject a certain quantity of strychnine into the lymph sac and had been instructed to study the symptoms, and with the onset of convulsions had been shown how to do a series of simple operations which show conclusively that the convulsions are due to the action of strychnine upon the spinal cord and not upon peripheral nerves, motor end plates or muscles; and more than that, if I had been shown that this action upon the cord was due to its effect on certain elements in the cord and not upon others, I would have realized that strychnine was a body which produced

marked and definite physiological changes. Having found that its presence (in some unknown manner) caused symptoms which indicated stimulation at a certain point, I would have been in a position to use strychnine rationally in any diseased condition where it might be desirable to increase the activity of the central nervous system and those functions which are controlled indirectly through it. I would also have had a hint as to its possible uses in the treatment of depressing poisons and as a synergist to the action of other drugs. Strychnine would then have been a reality to me, a useful tool, something I could have used with satisfaction. That simple experiment would have opened up a new field of thought. From various sources we hear expressions of surprise that physicians prescribe proprietary remedies. There is no occasion for surprise. With the training they have received in our medical schools and which they still receive in the majority of them, it is a surprise that pharmacopœial preparations are prescribed at all. If a school does not furnish a foundation upon which a superstructure may be built, graduates in medicine must still learn therapeutics from the label of the proprietary medicine bottle. This lack of pharmacological training is manifested on every hand among surgeons and medical practitioners of high standing. This leads to the most absurd mistakes. For example, a short time ago I was asked by one of the leading surgeons of Lincoln to step into his operating room and see one of his patients, "who was not doing very well on the table." I found a man undergoing an operation for ruptured appendix. The abdomen was full of pus. The patient was in a condition of collapse before the beginning of the operation. The heart beat was just discernible. The attendants had just injected subcutaneously into the axilla one quart of physiological salt solution, to which six drops of adrenalin chloride had been added. They were beginning with the second quart so treated. The surgeon remarked that the heart did not respond to the adrenalin. Of course it did not. The active constituent was oxidized and rendered inert long before it reached the heart. The patient died. Again, there is an obstetrician in our city who has no superior in the middle West. I lately discovered that he makes a routine of giving five drops of adrenalin chloride per os following labor, to cause uterine contraction and to prevent hemorrhage. Of course it is destroyed before it reaches the blood vessels of the mucosa. I know of another man who gave cocaine by the mouth and was surprised that he did not get local anæsthesia in the skin. I saw another successful practitioner use strychnine hypodermically in order to lessen the severity of an epileptic convulsion. Such examples might be quoted *ad infinitum*. Such errors would not occur had these men had pharmacological training and been able to appreciate the pharmacological point of view.

One physician, a graduate of ten years ago from one of the famous eastern medical schools, now a man well known in our state and a member

of the faculty of the University, tells me whenever he has opportunity, that he does not believe students understand pharmacological experimental work. He is of the opinion that it is beyond them. He maintains that they go through the experiments as a matter of routine. This is not so. The average student is a thinking being, his thoughts only need directing. From his pharmacological experiments and observations he will draw conclusions as to the therapeutic uses, which as a rule are surprisingly accurate.

My remarks have been made, chiefly with the medical student in mind, but they are just as applicable to the training of the student of pharmacy. As pharmacological methods are elaborated and perfected, they will become more valuable in pharmacopœial standardization. I do not mean that we shall make expert pharmacologists out of our pharmacists. That is not possible; but every pharmacist should understand the general principles of the biological test just as he does the general principles of the chemical tests of the Pharmacopœia. Likewise, experimental toxicology is an important subject to the practical pharmacist. In addition the study of pharmacology has an obvious educational advantage and must increase the standing of the pharmacist with physicians and with the people of the community in which he lives. Comparatively few medical schools, at the present time, offer courses in experimental pharmacology and I believe there are no pharmacy schools with the exception of Nebraska. I may be mistaken in this matter and beg to be corrected, if I am. My information has been obtained from the catalogues of the leading American schools and my time has been too limited to write to representative institutions. Pharmacologists are scarcely obtainable at any price because they do not exist. I suppose there are a dozen men in the United States who can be called expert pharmacologists, perhaps a few more or a few less, the number is immaterial. The question is then, how can we install pharmacological teaching in our schools. While pharmacologists are few, physiologists are more plentiful. I believe there are very few state institutions, even in the newer west, that do not have a trained, experimental physiologist. The first pre-requisite of a pharmacologist is of course, that he be a physiologist, and pharmacological work is the legitimate field of the physiologist. No apparatus is needed, which is not found in a fairly well equipped physiological laboratory. I can see no reason, why at least the fundamentals of pharmacology could not be taught to students of pharmacy. They should at least, be shown that drugs do induce physiological changes, that these changes are induced by action upon certain part or parts of the organism and that such action may be used as a means of classification and standardization. If such a movement could be made general, it would give a wonderful impetus to a science, which is full of promise for improving both medical and pharmaceutical practice. To me, it is a most significant fact that Ehrlich should, in the prime of his life,

turn away from the subject of immunity and serums, to devote practically all of his time to the study of pharmacological problems.

Pharmacy and medicine have a common aim, viz., the conservation of the public health. In recent years we have witnessed a marvelous campaign, waged by the two professions against quackery, graft, disease and the use of narcotic and habit-producing drugs and food preservatives, adulterants, etc. In this work the leaders of the pharmaceutical profession have not taken a place second to medical men. As time goes on, I believe both physician and pharmacist must assume more and more the role of teacher, and coöperate with the teaching profession, and use that profession, in disseminating the necessary knowledge to the public. An interesting experiment is being tried in Nebraska, with success. We have a State Teachers' Association of 4000 members. It is composed of twenty-one sections. Two years, ago, a few philanthropically inclined individuals requested that a section be added to the association, which should have for its object the discussion of subjects which concern the public health, especially the health of school children. This was done. The section was called the Section on Medical Education. During a three days' session of the association many sections must be held at the same time. Nevertheless, since the organization of the Medical Section 600 teachers have been in attendance at each meeting. The problems are presented to the teachers by the foremost medical and pharmaceutical men of our state, in such a way that the teachers can use the material to advantage in the school room. I speak of this matter because I believe it is one of the things to which, we as physicians and pharmacists should give our serious attention. I will admit, however, that I have a certain feeling of pride in the novelty of the scheme.

I would feel justified in giving courses in pharmacology to pharmacy students, if it were for no other reason than, that they might see for themselves the harmful effects of the groups of drugs, previously mentioned in order that they may be in a position to authoritatively instruct the citizens of the respective communities in which they live.

I am not in sympathy with some recently expressed views that the education of the pharmacist should be broader in order that his field of operation in a professional way, may be extended, but, I do believe in a broader, more thorough, and more scientific training, in order that his efficiency and usefulness may be increased in the field in which he now operates.

Mr. Taylor said that he found himself in a delicate position; that he felt he ought to keep still, yet his manhood prevented his doing so. He said that there were upon the program quite a number of important papers, and the session was now down to the time of adjournment, without any opportunity to present them; that men were here with work

blocked out and given a place on the program for a certain time, with no opportunity to present their papers. He regarded the paper just presented as one of the most important that had come before the Section at this time, but he was reminded of an expression he had once heard, that "it was better not to know too many things than to know so many things that were not so." He said this paper deserved the most careful consideration, and he deplored the idea of its going into the Proceedings without being thoroughly discussed. He would not hesitate for a moment to have it go into the Proceedings if it could be properly discussed, but it could not be at this stage. The whole article, in his opinion, was filled with a misconception of what the American Pharmaceutical Association had been doing in recent years. He thought the definition of "pharmacology" as outlined in the paper was diametrically and wholly and absolutely opposed to the Syllabus that had been adopted by this Association, after five years' work on it. He expressed the hope that the writer would not misconstrue him, because he had not the slightest disposition to discuss the paper on account of the limited time; and he hoped that no record would be made of his remarks in this connection. He did not know what solution could be offered of the difficulty, unless the paper should be referred to some committee, with power to confer with the author and bring it up at some future meeting.

Replying to a question by Mr. Hynson as to the specific point of his objection, Mr. Taylor said his chief objection was to the position in which the section found itself, with a long program, with other papers on it of importance equal to that of those already presented, and with an important paper before the Section now, which could not be discussed, and confronted with the possibility of its going into the Proceedings as an authoritative utterance from this body.

Mr. Lyman said he thought he understood the position of Mr. Taylor, and was sorry that he had not made his paper clearer on this point. He confessed that he had probably made an infelicitous use of the word "pharmacology," and declared that the idea that he had in mind was that of Mr. Taylor—that such represented the spirit of his paper.

The Chair stated that, as he understood Mr. Lyman, his paper was really on the subject of *Pharmaco-dynamics*, or what had been known as "*experimental pharmacology*." He said if there was no objection the Chair would entertain a motion to make some disposition of the paper.

Thereupon, on motion of Mr. Emanuel, seconded by Mr. Burge, the paper was ordered to take the usual course.

The Chair called for a paper by W. A. Puckner on the abuse of chemical formulas, which he said would be read by Mr. Motter.

Mr. Motter presented Mr. Puckner's paper as follows:

THE ABUSE OF CHEMICAL FORMULAS—AN APPEAL TO TEACHERS.

W. A. PUCKNER.

To the tyro in chemistry, chemical symbols, formulas and equations are a most interesting part of the study of chemistry. To him they present something at once definite and yet mysterious. While further study will teach the limitations of this system of chemical notation and bring the realization that chemical processes can but rarely be represented with absolute correctness, his fingers often itch to use the mystic symbols. And so it comes that we are inclined to use chemical symbols in and out of place; in a measure only, finding excuse therefor in their brevity, the saving of energy or graphite, as when C_2H_6O is written in place of the word "alcohol." Not only do some of us use chemical formulas in and out of place, but I have been constrained to feel sorry for the lungs of those who prefer "aitch two oh" to the word "water." I also have pitied the tongues that were obliged to contort themselves with "ce two aitch six oh" as a substitute for the word "alcohol."

It therefore is not surprising that in the exploitation of proprietary medicines to the medical profession, chemical formulas have been used to lend respectability to a product and at the same time to awe. This is particularly the case since the attention of the medical profession has been called to the unreliability of the so-called proprietary mixtures. The use of a chemical formula in connection with a proprietary medicine has probably also been made desirable by the prominence which has been given during recent years to the "coal tar synthetics." While in many instances the unwarranted use of chemical formulas was deliberate and with intent to deceive, in many cases they were used through ignorance, carelessness, or in the belief that a sort of poetic license permitted the use of formulas in connection with proprietary medicines to make them "look good."

In connection with my work on the Council on Pharmacy and Chemistry of the American Medical Association and the Chemical Laboratory of the Association, I have made it my business to correct, in the interest of chemistry, the abuse of chemical formulas. Unfortunately my efforts in this direction have often been made difficult through the lax use of chemical formulas by those whose knowledge in the matter and whose honesty could not be questioned.

As this abuse of chemical notation to which I have referred is contrary to the best interests of medicine, and as it is liable to discredit pharmacy, I wish to make an appeal to teachers in pharmacy schools to aid in correcting the abuse. Teachers in general, and teachers of chemistry in particular, can aid in this reform in several ways. In the first place they can cease the abuse on their own part in their lectures, their recitations and their writings. In the second place they may insist that their students do not use chemical symbols in a thoughtless, indiscriminate way. They also can aid effectively by recording their objections to the abuse.

As a matter of fact I feel sure that the adoption of the first suggestion will make the second superfluous, for to a large extent the student is but an image of his teacher. However, the student, after the way of the savage who when being civilized begins by adopting all the vices of his white-brother, is prone to adopt with a vengeance his teacher's propensity for chemical symbols.

I am well aware that those teachers who make incorrect use of chemical symbols do this as a time-saving expedient. When they write "5 Cc. HCl," or, still worse, say, "I added five Ce Ce aitch Ce El," they realize that, taken literally, their statement means that 5 cubic centimeters of gaseous hydrogen chloride were added. But they argue that, since it is quite evident to them that a watery solution of hydrogen chloride of a certain concentration was used, others also will know what it was intended to express. This may or may not be a correct surmise, but I am convinced that the time saved in this way is more than offset by the inelegance in diction and the harm which is done in suggesting to students slovenliness in the use of chemical symbols.

The second way in which teachers may help to correct the tendency toward incorrect use of chemical symbols is to devote some time to the teaching of *how not to use formulas*. A little time spent, now and then, in pointing out the incorrect use of chemical symbols has, in my experience, been of much value and interest to students, particularly to those who have obtained their first smattering of chemistry from quiz compends or from a certain class of correspondence schools. In the case of some students, the explanation that formulas can ever be out of place has appeared to them almost as a revelation, and has often aroused added interest in the minds of students. If such illustrations are from life, that is, from the drug-store, they will do much, I am sure, to give the student a more definite understanding of the use and the limitations of chemical formulas.

In the following are given some of the ways in which chemical formulas have been misused in the exploitation of proprietary medicines, as a proof that the abuse of which I have spoken is an actual one. Some of the illustrations given may furnish material for discussion to the teachers who believe in presenting to their classes object lessons taken from life.

Chemical Impossibilities.—Those who are at all familiar with the fraud which has been practiced in connection with the proprietary medicine business know, of course, that many a chemical formula has no more substantial existence than have dreams—and bad dreams at that. It is a frequent occurrence that "inventors" of such formulas are so ignorant even of the elementary principles of chemistry that the very formulas which they use are sufficient evidence that the formulas are humbugs. Thus, a preparation called thialion, shown by the Council on Pharmacy and Chemistry of the American Medical Association to be a mixture con-

sisting chiefly of sodium sulphate and sodium citrate with very small amounts of lithium, furnished a chemical formula,* the impossibility of which a first-year student in chemistry might well be required to know. It would form also an excellent illustration of the laws of combining proportions or valence, and of other elementary principles of chemistry.

Another class of fake formulas which shows the inability of exploiters of a certain class of nostrums to tell an untruth in a plausible way, is that class which fails to "obey" the "law of even atoms." When explaining to students that in carbon compounds the hydrogen atoms of a hydrocarbon should always be an *even number*, and that, consequently, when these hydrogen atoms are substituted by other atoms of uneven valence, the total atoms having an uneven combining power must consequently be even, interest in this theoretical consideration would probably be increased if it were pointed out that besides Gomberg's "triphenyl-methyl," numerous exceptions to the law may be found in the advertising matter of proprietary products, and that such formulas on entirely theoretical grounds may, with considerable assurance, be put down as humbugs. The following may serve as illustrations of this class of chemical impossibilities:

A cancer cure (Journal, July 27, 1907, p. 345) was said to contain a "new compound derived from a union of hydrocarbons," having the formula $C_{27}H_{17}O_2$. Asked for an opinion as to the probable truthfulness of the claims made for the product, the "Journal of the American Medical Association" said, in part, that "Fortunately for the profession (unfortunately for the promoters) the circular contains such evident earmarks of quack literature that few will be humbugged by it. To a chemist the 'formula' of the supposedly 'new compound derived from a union of hydrocarbons,' is sufficient evidence of the nature of the stuff, for to him $C_{27}H_{17}O_2$ spells 'impossible.'"

A preparation called "Pas-Avena" was stated to contain "Somnalgesine," and this compound was variously represented by the formulas $C_{30}H_{28}N_5O_3$, $C_{30}H_{30}N_5O_3$ and $C_{30}H_{38}N_5O_3$. Unfortunately neither of the three formulas are in conformity with the law of even atoms, and may with safety be called humbugs. Examination of the preparation seemed to show that the hypothetical "Somnalgesine" was in reality a mixture of antipyrine and acetanilide.

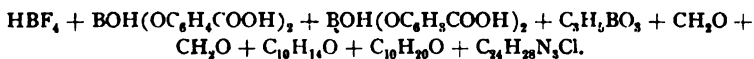
Possible Compounds in Impossible Mixtures.—Quite frequently when "devising" a chemical formula with which to embellish advertising matter one is selected that is known but which cannot exist in the mixture which is stated to contain it.

As an illustration of this class the ingredients asserted to be present in some of the antiseptic solutions typified by Dobell's solution may be taken.

* " $3Li_2O.NaO.SO_3.7HO$." "Sodio-trilithic anhydrosulphate" is given as a synonym. An elaborate graphic or structural formula is also given. (Journal, November 3, 1906, page 1500.)

Unwilling to acknowledge that their preparation differed from that of a horde of others only in name, some promoters have exercised considerable ingenuity in devising ways and means of making it appear that their product contained things not contained in others. So as to avoid detection there has been a tendency to produce imaginary compounds of the actual constituents of the preparations. Thus one of these alkaline antiseptic solutions, shown by analysis to contain carbonate, borate, salicylate, benzoate and other things, has been stated to contain sodium benzosalicylate. While a benzosalicylic acid, formed by interaction of the phenolic hydroxyl of the salicylic acid with the carboxyl of the benzoic acid, has been described (Bloch, Review of Amer. Chem. Research, 1906, p. 230), it would be quite safe to say, from a purely theoretical consideration, that such a combination cannot exist in the solution claimed to contain it. Since the description of benzosalicylic acid specifically states that the acid is readily saponified, it is therefore impossible to retain such a compound in the alkaline solution.

Again, it does not need any chemical examination to show that the composition at one time claimed for *Germiletum*, one of the many alkaline antiseptic solutions, was impossible. This preparation was stated to be a "slightly alkaline chemical solution of borohydrofluoric acid, borosalylbenzoic acid, boroglycerin, formaldehyde with menthol, thymol and antiseptic aromatics." The following formula was given :



Disregarding the unwarranted use of the plus sign, to which reference will be made presently, it needs no great amount of knowledge to say that such of the compounds as are in reality capable of existence alone cannot exist under the conditions obtaining.

Simple Mixtures Presented as Chemical Compounds.—Since a chemical formula lends an air of respectability to a remedy, there has been a decided tendency to represent mixtures or solutions by chemical formulas. Various methods of doing this have been adopted. In some instances, as in the preparation called *Germiletum* just referred to, the constituents of the preparation have merely been connected by plus signs, thus creating the impression of combination without definitely making the false statement. In other cases the formulas for the several constituents are connected by periods, the sign commonly used to indicate combination between carbon atoms in carbon compounds, and thus more specifically asserting combination between the constituents of the preparation. In many cases the expedient has been adopted of adding the formulas of the several constituents together, thus effectually hiding the nature of the preparation. This is often still further complicated by an error, intentional or accidental, in adding the several formulas together.

In the advertising matter issued for a preparation called "Glycozone" the formula $C_3H_6O_4 + C_3H_8O_3$ usually appears under the name of the article. While this conveys the impression that the preparation is a compound consisting of the constituents indicated in molecular proportion, an analysis (Journal, June 5, 1909, p. 1851) showed it to consist essentially of glycerin to which had been added 5 per cent. glyceric acid.

The preparation known as "Uron" probably belongs to the same class. The exploiters of Uron provided the following formula: $LiC_{13}H_7N_4O_2$. An analysis (Journal, Nov. 3, 1906, p. 1500) showed it to be a mixture of lithium benzoate and hexamethylenamine, and suggests that the formula presents an unsuccessful attempt to add the formulas of the constituents together.

The second method of misrepresenting simple mixtures as definite chemical compounds is the one most commonly employed, chiefly in connection with certain well known organic bodies of established therapeutic efficiency, as in the case of hexamethylenamine, phenacetin, antipyrin, etc. These bodies are weak bases, and form under certain conditions unstable compounds with acids—apparently "by addition." Since a compound of, for instance, hexamethylenamine with some acid, may be sold under a name which will not reveal the presence of the valuable but well known hexamethylenamine, and at a price many times that of its chief constituent, this temptation is great. As these substances really do form combinations, though weak and almost completely hydrolyzed into their constituents when dissolved in water, proof that such mixtures are not definite bodies is not always a simple matter.

One of the host of "fake synthetics," this one of German extraction known as Formurol, is claimed to be hexamethylenamine sodium citrate. According to the formula which the Chemical Factory Falkenberg, in Falkenberg-Grünau, near Berlin, Germany, has supplied, Formurol is a compound produced by the combination of hexamethylenamine and primary sodium citrate in molecular proportions. While theoretically such a body is capable of existence, Zernik, in the Pharmaceutical Institute of the University of Berlin (Arbeiten, a. d. Pharm. Institute d. Univ. Berlin, 1907, vol. 4, p. 46; Journal, vol. 52, p. 1273), demonstrated that Formurol is a mechanical mixture. The method of analysis used by Zernik is generally applicable to products of this kind, and consisted, first, in demonstrating that the hexamethylenamine, sodium and citrate radicals were not present in the relative proportions which were required for the formula, and, second, that by means of solvents which would preclude decomposition, the hexamethylenamine content of the mixture could be dissolved out and thus separated from the sodium citrate.

Impure Substances Designated by Chemical Formulas.—Just as some have the slovenly habit of designating the complex mixture, official in the United States Pharmacopœia as "Chlorinated Lime," by the chemical

formula of calcium hypochlorite, its chief constituent, so exploiters of medicines have a tendency to dignify crude, variable or indefinite substances by the formula of the chief or important constituent. Thus a firm offered for sale an article apparently obtained as a side product in the production of turpentine. While the statements of the firm showed that the preparation was a mixture containing chiefly some menthone, the mixture was supplied with a chemical formula, and at first the firm waxed indignant when objection to the misrepresentation involved in the use of the formula was made. In another case a manufacturer who should have known better gave a chemical formula for a mercury compound of nucleic acid and only abandoned it when shown that the product on the market did not contain the amount of mercury required by the formula. While salts of bismuth are notoriously variable and indefinite, proprietary bismuth compounds are almost universally provided with definite chemical formulas. Thus, tannismuth, a compound of bismuth and tannin, has in the past been provided with a chemical formula, although the circular matter which contained its chemical formula also contained the statement that the bismuth content of the preparation varied from 17 to 21 per cent., and gives the needed evidence that the formula was unwarranted.

Simple Solutions Represented as Compounds.—Just as the symbols for hydrogen chloride, hydrogen sulphate and ethyl hydroxide are used to represent the solutions official as hydrochloric acid, sulphuric acid and alcohol, so dealers in medicines have been inclined to represent simple solutions by the formula of the dissolved substance. Thus, a preparation which is now designated as an elixir of chloral alcoholate was at one time marketed in such a way as to give the impression that it was a definite chemical substance.

There is still another way in which teachers can aid in putting a stop to this form of humbuggery in the proprietary medicine business. This would consist in extending their efforts as teachers beyond the four walls of the class room, to the one who perpetrates those formulas. That teachers should so extend their efforts is, I hold, not only their privilege but their duty if they would be real teachers. To be more specific, I believe every teacher might with entire propriety protest to those who are guilty, whenever such abuse comes to their notice. It is a safe prediction to say that, should every teacher take it upon himself to protest by direct communication or through the press against every incorrect and misleading use of chemical formulas coming to his attention, this abuse would become practically obsolete within a short space of time.

The Chair called for discussion on the paper just read.

Mr. Hallberg said that while he was not a chemist, and therefore could not appreciate some of the points made by the writer from a chemical point of view, he wanted to refer to the suggestion about the use of chem-

ical titles in proprietary remedies. Commenting upon the author's language: "I am well aware that those teachers who make incorrect use of chemical symbols do this as a time-saving expedient." He said he considered that it was practically necessary to use these shortened chemical symbols in pharmaceutical laboratory work, and he regarded it as proper, legitimate and desirable to do so. In fact, it was practically impossible to conduct the work in the laboratory without the use of such abbreviations. He gave some applications of the convenient use of these symbols. He considered the criticism, as far as it applied to pharmaceutical students, as not well taken, and could see no reason why students should not avail themselves of these shortened forms, where they had not the significance they had in chemical work, in which he could understand the importance of correct statement, in order that the student should not be led into error. He referred to the fact that, in the Journal of the American Medical Association, these abbreviations had been permitted right in connection with the text.

Mr. Kraemer said that when Mr. Motter started to read Mr. Puckner's paper he was very much impressed with the statement regarding the use of abbreviations by students and chemical writers. He did not know of any class of writers that were so careless as to form of expression as the average writer on chemical subjects. He said that it was quite common for authors to use the abbreviations in such a way that they made poor English. Mr. Kraemer said he fully appreciated the importance of saving the time of students, under ordinary circumstances, in the use of these symbols; but he thought it was also very important to call attention to the care that should be exercised in writing papers to see that this was not carried to the extreme so commonly seen in ordinary work.

On motion, the paper was ordered received, to take the usual course.

The Chair next called on Mr. Wilbert to present a paper on the A. M. A. Council of Medical Education, and Mr. Wilbert presented his subject in abstract, the full text of his paper being as follows:

THE COUNCIL ON MEDICAL EDUCATION OF THE AMERICAN MEDICAL ASSOCIATION.

BY M. I. WILBERT.

In a history of the American Medical Association, written more than half a century ago, Dr. N. S. Davis, the father of that association, says: "Of all the voluntary organizations in our country none is at this time in a position to exert a wider or more permanent influence over the temporal interests of our country than the American Medical Association."

This assertion printed 55 years ago, while a theory at that time, is recognized today to be an accomplished fact, and the force of this assertion is perhaps best illustrated by the many and varied influences that the American Medical Association is wielding in the betterment of conditions

now existing in matters medical. These present day activities are not, however, entirely new and the essential features of the important work now being done by the American Medical Association, particularly that now undertaken by the Council on Medical Education, was foreshadowed in the earlier efforts made by that Association.

The great wave of reform which swept over practically all of the countries of the civilized world some sixty years ago, prompted the better qualified men in the medical profession of America to give heed to the call of the New York State Medical Society for a meeting in New York City, and many, if not all, of the State Medical Societies then existing were represented by delegates.

The primary object of this convention, as set forth by its promoters, was "the adoption of some means to elevate the standard of medical education and advance the dignity and usefulness of the profession." At the convention, it was pointed out that during the period from 1830 to 1845 the number of medical schools in the United States nearly doubled and that this increase had led to an active rivalry for students and a general lowering of the original requirements. Even in the better class of medical schools 16 weeks of instruction was regarded as the maximum length of the college term while in others the term extended over from 10 to 13 weeks. A compilation of data by one of the earlier Committees on Medical Education of the American Medical Association shows that in the 20 leading medical colleges of the United States, in 1847, the regular term covered from 13 to 16 weeks of lectures by from 3 to 7 professors, and that only 5 of the 20 schools required a practical knowledge of anatomy and in only 6 of the schools was any attempt made to give clinical instruction.

The requirements of the several schools were usually attendance on two courses of lectures or, in the event that the candidate had been in practice for more than 2 years, one course of lectures was sufficient.

Some idea of the general status of the practice of medicine in this country is evidenced by the report of a committee on the status of medical practitioners in the state of Virginia where, in 1847, there were a total of 972 medical practitioners 678 of whom had received diplomas from medical schools while 249 practiced without authority.

The need for correcting existing abuses in connection with medical schools and the practice of medicine generally was generally recognized. Appreciating the difficulties that would be encountered the American Medical Association Committee on Medical Education, for 1851, points out that: "One of the means of removing the abuses which exist in our profession is to expose and attack them. While this should be done thoroughly and fearlessly it should also be done with a candid and conservative spirit. Any exposure of these abuses which is made with a wrong spirit does harm."

One of the really serious problems of that day was found to be the limited qualifications of the greater number of even the graduates in medicine. Thus it was shown that of the 12,400 graduates from eight of the leading colleges but 934, only 1 in 13, had taken up the practice of medicine while 3,211, or 1 in 3, had entered the clerical profession.

The enthusiasm prevailing among many of the members of the medical profession caused at least some of the then existing schools to extend their course quite appreciably. Thus in 1851 Dr. Geo. B. Wood announced in his introductory lecture that the University of Pennsylvania had extended its regular course to six-months.

For several reasons the earlier attempts of the American Medical Association to improve medical education failed to have a permanent influence and Geo. B. Wood, writing in 1860, says: "After the first enthusiasm of the profession under the influence which gave rise to the American Medical Association had subsided, it became obvious that our school would be unable to sustain itself in the degree of expansion which it first attempted and that the six-months course must be abandoned."

For many years the American Medical Association was practically dominated by men interested in the development of proprietary medical schools, so that for a long period of time little or no progress was made. Less than two decades since, Dr. H. C. Wood, in an address to the students in the Philadelphia College of Pharmacy, asserted that: "Medicine has run riot in these United States. There is no civilized country, or even a semi-barbarous republic of South America in which the profession of medicine is not regulated by law, but here every man ignorant or learned in the profession has been allowed to put out his sign."

"Almost any half dozen doctors, may, if they wish, establish a medical school, at almost any cross-road and each new medical school is a new competitor and leads to the cheapening of the degree . . . and so the process has gone on until diplomas of American Medical Schools have come to be a laughing stock."

This was the general condition existing in the early nineties when a number of the more able practitioners interested themselves in renewed efforts to raise the standards of medical education and thus give to American medicine a degree of respectability that had never been claimed for it before.

The organization of the medical department of Johns Hopkins University was undoubtedly one of the more important factors in the development of this movement, and the originators of that school will ever hold a prominent place in the history of American medicine for having established a new standard for medical education in this country.

Another and perhaps the most important factor in this evolution was the reorganization of the American Medical Association in a way to effectually rid it of the domination of men interested in proprietary medical schools.

The several steps in the evolution of medical education in the United States, while interesting, are not creditable to the ideals or motives of the founders of these institutions. Many of the proprietary schools were originated by men who were themselves not graduates in medicine. At a later period the leading schools at least saw the error of their way and made some attempt to improve; this failing, they continued as best they could, and finally, through the initiative of a few strong men, a limited number of schools introduced higher requirements and, with the assistance of other agencies, are now compelling the more backward schools to improve their curriculum or to close their doors.

The Council on Medical Education, the leading spirit in this present-day reform movement, was instituted in 1904, and its functions are defined as:

1. To make an annual report to the House of Delegates on the existing conditions of medical education in the United States.
2. To make suggestion as to the means and methods by which the American Medical Association may best influence favorably medical education.
3. To act as the agent of the American Medical Association (under instructions from the House of Delegates) in its efforts to elevate medical education.

At the first Annual Conference of the Council on Medical Education of the American Medical Association, held in Chicago, April 20, 1905, it was shown that some of the best and all of the worst medical schools in the world are to be found in the United States.

The proprietary medical school, in the widest application of that term, was early recognized as being the greatest bar to progress, and from the beginning attempts have been made to bring about a closer affiliation between medical schools and recognized universities.

In all European countries medical schools constitute the medical faculties of established universities or are directly controlled by the university. In our country, however, the medical school has usually been developed as an independent organization, or when connected with an established university the affiliation was in name rather than in fact. Largely because of this latitude in our established practices we find that of the 309 medical colleges in all countries, the United States has 144, or 47 per cent., while the 30 other nations altogether have only 165, or 53 per cent.

In addition to the Council on Medical Education, a number of agencies are now at work which tend to elevate medical education. The great universities with medical departments are endeavoring to advance their requirements to a point at least equal to the requirements of similar institutions abroad. The examining boards in many States have done much, the Association of American Medical Colleges has been a factor of importance, and outside influences like the Carnegie foundation for the advance-

ment of teaching are in a position to and do wield a beneficent influence on the general trend of this movement. All of this influence, however, would avail but little were it not for the widespread publicity that has been given to the several efforts by the Journal of the American Medical Association and the fact that through the Council on Medical Education the efforts of these several agencies have been correlated and enlarged upon.

The several steps in the evolution of medical education are perhaps best illustrated by the compilations of results published annually in the Journal of the American Medical Association. While I should like to present to you a more comprehensive study of the several annual reports, I will content myself with calling your attention to but one.

The report for 1908 shows that the total number of medical students (matriculants) in the United States for the year ending June 30, 1909, was 22,145, the lowest number since the Journal began compiling these statistics in 1900 and a decrease of 2,131 below 1907. From the tables given it appears that the maximum attendance was reached in 1904 with 28,142.

The total number of graduates amounted to 4,442, the lowest number in a decade; the maximum 5,747 was reached in 1903.

Up to the present time the Council on Medical Education has succeeded in:

1. Reducing the total number of medical colleges.
2. Compelling existing colleges to raise their entrance requirements, lengthen their course and increase their facilities.
3. Publishing facts in connection with existing conditions which have served to bring about improvements in State medical-practice acts and increased requirements on the part of State licensing boards.

The work that has been accomplished by the Council on Medical Education of the American Medical Association amply illustrates what can be done by united effort on the part of the better class of men engaged in any one profession or calling.

The recognition that has been accorded to American medicine during recent years, and the outside influences that are now at work to still further improve the status of medicine in these United States should spur us pharmacists on to even greater efforts than we have ever made in the past, to establish for ourselves a status similar to that now enjoyed by medical men.

The American Medical Association has demonstrated that remarkable changes can be brought about in a comparatively short space of time. The publicity that has been and is now being given to the efforts of the various agencies engaged in raising the standards of medical education is sure to attract attention and, unless we pharmacists ourselves take the initiative, outside influence will surely compel reforms in the teaching as well as the practice of pharmacy that will be equally far-reaching.

The Chair invited discussion on the paper just read.

Mr. Taylor said he felt deeply on the proposition just proposed, and wanted to call the attention of this *Association* to some of its fallacies. In the first place, he said, the Medical Council certainly had no effect whatever in the State of New York. In the second place we believed it did not have any effect throughout the United States. In the third place, he could not conceive of any right to prevent the American Pharmaceutical Association from tying up with the larger organization. He was prepared to debate this matter at length, but conditions prevented any discussion at this time. Mr. Taylor did, however, make some remarks upon the situation in New York, and claimed that what had been accomplished there was not through the Council of Medical Education, or the American Medical Association, but it was the medical houses and medical colleges that did the work.

Mr. Kraemer did not agree with Mr. Taylor. He thought this Association was indebted to the American Medical Association for what they had done. While he did not think any one desired to give any one association undue credit, he had been very much interested in the paper that Mr. Wilbert had presented, and whether this work was to be done through some *special organisation*, as at present, or was to come through this Section, he could not help but believe that all these things were tending to the uplift now in progress. The outside organization, as well as the work that had been done here, had certainly had an uplifting influence. He moved that the paper be accepted and referred to the Committee on Publication.

Mr. Cliffe seconded this motion. He said he thought Mr. Taylor had taken an erroneous view of the attitude of this Section, and the work that had been done here. The papers, he said, were presented by invitation, and were presented as a rule to this body—to this forum—through which these ideas could be disseminated to the pharmacists of the country at large. It did not necessarily involve the proposition that the Section or Association agreed with the conclusions of the writers. They were simply presented for consideration by the pharmacists of the country of the germ of thought advanced which eventually brought good through discussion; and whether that discussion occurred subsequently to the meeting or at the time of the meeting was really an immaterial matter.

The Chair thereupon put the vote on the motion to receive the paper and refer it to the Publication Committee, and it carried.

The Chair next called for a paper on the subject of "Pharmaceutical Education in Germany," by H. P. Taylor.

After an explanation of the circumstances under which the paper was written and presented, Mr. Taylor asked the privilege of withdrawing it without reading, as he did not consider that the Section, now at the close of its third session, and with practically all of its members gone, was a "proper forum of debate."

The Chair stated that Mr. Taylor's wishes in this matter would be acceded to, and the paper would be returned to him.

The Chair said it was unfortunate that the Section had reached a very important part of its program, with practically all its members gone, but disclaimed any responsibility for the situation, as the regular order of business had been interrupted yesterday by having to give way to an adjourned session of the general Association. He said the next matter on the program was the report of the Committee on Pharmaceutical Syllabus, and asked Mr. Taylor if he had any report to make.

Mr. Taylor said he was *Secretary* of the committee, but the Chairman was to have presented the report, and the President of the Association was to have been here to speak on one subject and Mr. Engstrom on another, and both were absent.

And so the matter was passed.

The Chair next called for a paper by Mr. Eberle, of Texas, upon the subject of "Suggestive Methods in Teaching Pharmacy"—a paper not on the program; and suggested that the paper be read by title, in the absence of the writer.

The motion was seconded by Mr. Roe, of Indiana, and carried.

The text of said paper here follows:

SUGGESTIVE METHODS IN TEACHING PHARMACY.

BY E. G. EBERLE.

The paper here presented is at the request of the Chairman, who has asked me to explain my method of communicating information to students. I call it a plan of leading the student to think and obtain the knowledge for himself. The information is already there; all that is necessary is to aid him in discovering and after that it is for him to make use of what he has discerned. My explanation is very superficial and brief, but you will read between the lines. Nor do I think I am presenting anything new, but having been away from the fountain-heads of pharmaceutical knowledge and source of supply since my school days, I developed my own course of instruction, with the text-books of my superiors for a guide.

The purpose of education is to train the mind, to qualify by instruction, and this is best and most effectively accomplished by inducing thought, consideration and investigation. Lack of this is frequently evident in book learning, which so very often simply gives definition. The student who seeks to know the reason why will attain better results than the apparently brighter one who learns without analysis or synthesis. The writer in teaching students dwells more on the work done in accomplishing results than in the means employed or the results themselves, deeming the why and wherefore more essential and valuable because it teaches general application of the principles involved. The inference, for instance, that heat acts as a clarifying agent in fluids containing albumen is incomplete without

the further explanation that albumen is coagulated by heat; that this caused the fluid to be more or less opaque or cloudy and, now, that it through the action of heat has been thrown out of solution, the fluid is transparent. This with experimentation shows the application of the method, necessitating of course further explanation when this may and may not be used and why.

In explaining general principles involved in preparing, comminuting and extracting drugs, each step has interest when simply explained with practical work. Take comminution; it is an easy matter to show why a certain means to accomplish this end is best, and why the method employed in powdering another drug is not applicable, and when exemplified impresses the student, it promotes thought and thereby proper application. It is well enough to say that in a No. 40 powder a certain percentage only shall pass through a sieve of a finer mesh, but, unless the objections are demonstrated, it is not thoroughly made clear to the student's mind. He should also be shown that force should not be used in sifting, for thereby larger pieces come through; that to throw these away augments the strength of the drug. To take an assay method, tincture of opium for example:

The first step in the process is to remove the alcohol and the next to obtain an aqueous solution in which matter insoluble in water is thrown out. The reason for keeping the washings separate and evaporating this first to a small volume is to avoid unnecessary heating of the concentrated solution. This solution naturally contains other alkaloids of opium than morphine. The alcohol is added to prevent precipitation of the coloring matter which would contaminate the separated morphine; the ether removes codeine and other ether-soluble alkaloids, ammonia is now added to free morphine as alkaloid; the thorough shaking for ten minutes is to aid in this separation. The mixture is allowed to stand for at least six hours to insure complete separation; it should, however, not stand longer than twenty-four hours, for by that time other matter will begin precipitating. The next step is to remove the liquid portion containing other alkaloids than morphine by filtration. The filters are moistened with ether so as to facilitate this. The Pharmacopœia prescribes a double filter, others prefer a single filter of hardened paper from which the crystals of morphine can easily be removed. Those of the Pharmacopœia are plain, not folded, for like reason.

The crystals of morphine are washed with alcohol saturated with morphine; this is to remove coloring and other foreign matter, the alcohol solution being saturated will no longer dissolve morphine. A solution may be saturated with one substance and still be a solvent for others and this is the case here, but if the alcoholic solution was not washed out, on evaporation of the alcohol its morphine content would be left within the filter, therefore ether is again used to wash this out. The crystals are then dried at a temperature not exceeding 60° C.; this is to prevent loss

of the water of crystallization. Then the crystals are weighed on a watch glass. In this condition there are still some impurities left with the morphine and these are removed in the next step of the process, dissolving the morphine in lime water. This leaves the impurities in the filter, which being dried and weighed and weight deducted from that previously obtained gives us the amount of morphine in 100 Cc. There is opportunity for error in the counterpoising of filters, as one is apt to absorb more of the calcium hydroxide than the other, also more or less of it is converted into calcium carbonate.

The student studies the different drugs, method of collecting, preparing, etc., but it is a good idea in each class of preparations to pick out one or two and tell its story from the beginning; thus of opium, to begin with the seed, tell of the growth up to the collection of the juice, of its home and those engaged in raising and collecting, continuing until the lump of the opium is in the hands of the pharmacist ready for being made into preparations. This is very much after the "kindergarten" presentation and may not be in conformity with more advanced teaching. It is impractical to devote this much time to many preparations; still even one preparation considered in this manner refreshes the mind and perhaps impresses the student better than when the subject was more thoroughly explained at an earlier period.

These brief examples will suffice for explaining my plan of teaching the juniors, with whom I devote more time and to whom I give most attention; for after laying a good foundation and leading them to think rather than to commit, to analyze and dissect and thereby discover in preference to accepting statements simply because they are facts and have been stated by some one who knows, their studies of the succeeding year are much more readily assimilated and applied.

The Chair now called for the installation of the officers of the Section as the final order of business, and requested Mr. Peter Jensen, of Tacoma, to introduce the Chairman-elect, Mr. Charles W. Johnson, of Seattle.

Mr. Jensen performed the duty assigned him in a few graceful words of compliment to Mr. Johnson for the valuable work he had done, and said it had been greatly appreciated among his people. It had been a great and good work, as those who knew of it could testify. He said the State of Washington was proud of Mr. Johnson, and that he had not only "made good" among his people in the West, but his name stood among the greatest in the country in his chosen profession.

Mr. Johnson said it was unnecessary for him to make any extended remarks at this time, and he only wanted to say to the members that the Committee could only be successful at the next meeting by a thorough and earnest spirit of fraternity and interest in the cause of education and legislation throughout the country, and he thought he voiced the sentiment

of the Committee when he said that they earnestly solicited the support of the members.

Mr. Johnson then took the chair.

The Chair stated that as the newly-elected Secretary was absent, his installation would have to be dispensed with.

Mr. Kraemer said this had been an unusual year in the history of the Association, and that there had been so many papers presented, and the work had been so difficult, that he felt it was proper to move a vote of thanks to the retiring officers for their ceaseless efforts to make this meeting a success.

The motion was seconded by Mr. Hays and others and carried unanimously.

On motion of Mr. Roe, the Section then adjourned.

REPORT OF COMMITTEE ON DRUG REFORM OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.*

The importance of the National Food and Drugs Law of 1906 need not be impressed on pharmaceutical men, nor the benefit already realized from it and from the numerous State Laws that have been modeled largely upon it. Yet every pharmacist knows that adulteration has by no means been eliminated since these laws have been enforced. It might seem to many that these laws have operated more to expose the extent of adulteration than perceptibly to check it.

Pharmacists do not need, moreover, to be reminded of the danger to their profession from drug adulteration. The increasing distrust of drug-store preparations, on the part both of physicians and of the general public, and the resultant tendency toward "drug nihilism," have been generally noted by writers in the different pharmaceutical journals.

The first object of the American Pharmaceutical Association is, according to its constitution, "To improve and regulate the drug market by preventing the importation of inferior adulterated drugs, and by detecting and exposing home adulterations."

In accordance with this object President Rusby, in October, 1909, appointed the Committee on Drug Reform. A former committee, although it bore the same name, seems to have been designed primarily to co-operate with a similar committee of the American Medical Association. The present committee, having a somewhat different phase of work, has therefore been compelled to begin anew.

In view of the short interim between the meetings of the association, it was evident at once to the committee that few immediate, tangible results could be accomplished. To this lack of time was added the difficulty of determining the exact function of the committee. This function is not, of course, executive. In the opinion of the president of the association and of the members of the committee, its duty lies rather in awakening public interest in drug laws, and in influencing the legislation and enforcement of them by indicating at what reform must be directed and by suggesting, as far as possible, how that reform may be accomplished.

According to this conception of its duty, the committee, in February, issued 75 circulars, requesting opinions concerning the means necessary to accomplish four things:

1. More thorough restriction of the importation of impure drugs at all United States ports.

* This report was read by title at the second general session of the 1910 meeting, but failed to receive final action.—THE GEN'L SEC'Y.

2. Improvement in the inspection of intrastate commerce in drugs.
3. Uniformity and efficiency in State inspection and supervision.
4. Co-operation between State and Federal inspectors and laboratories.

The circular also asked for opinions on the proposed changes in the substandard clause of the Federal Act, (Sec. 7) which would, if adopted, require the label of any substandard drug to state not only its absolute standard, but also the relation of that standard to that of the U. S. P.

The correspondence elicited by this circular has been a decided help to the committee, and the interest manifested by a considerable number of pharmaceutical journals, schools, and other important institutions will undoubtedly further the progress of reform.

The opinion seems to be prevalent that inspection of drugs at the ports of this country should be made more stringent. In the first place, not all ports of drug entry are under inspection, and in the second, at those ports which are, the final decision on the question of admission or rejection of drugs, after they have been analyzed by experts, rests with persons who know almost nothing of them. Moreover, responsibility for the supervision of drug importation is divided between different divisions of the Departments of the Treasury and of Agriculture. If this responsibility can be made more definite by fixing it on a single department, the condemnation of undesirable drugs will be much more certain.

President Rusby has already called attention to the importation of materials used in the adulteration of drugs. Some of those materials, since they are also used for legitimate purposes, cannot well be excluded. We may, however, exclude those used wholly for adulteration, such as ground olive pits and cocoanut shells, which are, under the present laws, shipped boldly into this country under their real names. In the opinion of eminent legal authority consulted by this committee, the exclusion of such materials is possible by legislation.

Mr. M. I. Wilbert, whose connection with the administration of the Federal Drug Law is well known, writes that more rigid inspection of Drug importation can be realized "only by education so as to bring about a *demand* for such inspection."

Interstate supervision naturally presents a more difficult and troublesome problem to the federal officials than does the work at the ports of entry. There can be no doubt that this interstate drug inspection, considering the funds and the force of men available for the work, is remarkably efficient. Yet there is no doubt, on the other hand, that inspection never reaches a large part of interstate drug traffic, and that shipments of adulterated drugs are, at present, being safely made. Such shipments will continue to be made until the federal government allows this interstate supervision a much larger appropriation, for efficiency can be obtained only with a larger and better paid service.

State drug laws differ to such an extent that only general suggestions applicable in all states, can be made here. Perhaps, at present, more attention should be devoted to law enforcement than to legislation, for in drug reform, as in every other reform, there is a lamentable tendency to regard the work as accomplished by the mere passing of a bill through the legislature.

More stringent administration of the State drug laws now existing can be obtained by impressing the importance of such laws on the public and the responsibility involved in their enforcement on the State Officials. This work can be achieved by a future drug reform committee with at least one member from each State Association.

Another important change which the committee wishes emphatically to recommend is the separation of the duty of the enforcement of drug laws from the work of departments whose principal function is entirely foreign to the control of drug traffic. Prof. E. V. Howell, of this committee, writes that in North Carolina "The Food and Drugs Law is in the hands of the Department of Agriculture, which is maintained by a tax on every ton of guano. Thus the farmers support the department. So far the department

has done good work on fertilizers, stock foods, poultry powders, and plant foods, but nothing for pure Drugs for sick people." The enforcement of drug laws is worthy of a distinct division of an independent State Board of Health, or Board of Pharmacy.

Enforcement of the drug laws can be much improved by co-operation between the State and the Federal Laboratories and inspectors. President Rusby has cited a case which illustrates the need for this co-operation. Dr. L. F. Kebler, Chief Chemist of United States Drug Analyses, on discovering material used for adulteration in a Hoboken drug house, was openly defied by the proprietors, since the material was not under federal jurisdiction. The proprietors boldly admitted that the material in question was to be used in drug adulteration. In such a case as this, co-operation with the state officials would have brought about an inspection by officers whose authority could not have been defied.

Mr. Wilbert, referred to above, writes concerning co-operation: "Unless some one is willing to agitate this question quite thoroughly each individual drug inspector will be a rule unto himself and the several state laws will continue to be, as they are at present, enforced without regard to the requirements made in any other state."

Further efficiency in State enforcement can be gained by more uniformity in drug standards. As long as scores of standards exist for every drug no stringent administration of drug laws can be expected. Recent State legislation has shown an encouraging tendency to adopt the National Standards, either entirely or with very few exceptions. In twenty-nine States the federal clauses defining adulteration and misbranding of drugs are thus followed verbatim or in substance. In other words, the laws of almost two-thirds of the states resemble the National Act in these important provisions. Yet the remaining States in which these provisions are dissimilar include some of the most important ones, such as New York, Massachusetts, Michigan and Illinois.

Uniformity of standards might be promoted by the efforts of such a committee as has already been suggested, with at least one member from each State in the Union.

A special recommendation which the committee desires to make, concerns the lack of inspection of drugs used by the so-called "dispensing physicians," who are especially numerous in the western part of this country. This lack of inspection of physicians' drug supplies, leaves an unwarrantable loophole for the distribution of adulterated drugs. As a general rule, moreover, dispensing physicians are not especially careful in buying their drugs, many of them being governed by price alone. It is therefore desirable that the State inspectors should be given the right to examine drugs in the possession of physicians and to prosecute the manufacturers of any such drugs who shall fail to comply with the standards which are provided for druggists. Professor J. H. Beal in an article on "The Quality of Drugs Dispensed by Some Physicians,"* exposes this channel for the distribution of adulterated drugs.

During the past year, beginning March, 1909, 1127 samples of drugs have been examined in the Kansas Drug Laboratory and reported in accordance with the Kansas law to the State Board of Health. Three hundred and eighty-two of these samples were Tinctures of Iodine, 50 per cent. of which were found below standard; 134 were Essence of Peppermint, 65 per cent. below standard; 145 were Spirit of Camphor, 28 per cent. below standard; 55 were Tincture of Ginger, 31 per cent. below standard. These 716 samples were preparations which the druggist had made, or should have made, himself. The remainder was composed of 50 samples of patents and 344 miscellaneous drugs. Among the patents were several hair tonics found to contain Wood Alcohol, while other patents were misbranded. The percentage of adulteration and misbranding is even greater among the miscellaneous drugs than among those mentioned in their respective classes. It should be noted in this connection that inspectors are instructed to

* See Drug Cir. '08, : 367.

collect only suspicious samples and therefore the above percentages of adulteration indicate only the average purity of suspicious drug products. But this showing is sufficient to convince anyone of the importance of intrastate drug reform, and especially of that phase of it, which applies to individual druggists. As a California correspondent expressed it, "we will have to reform the druggist before we can reform the drugs." Similar analyses have doubtless been completed in other states. The Kansas analyses have been cited because the work in that State is more familiar to the chairman. The committee is satisfied, however, that unless work of a similar nature is carried on in every state, the ideal of drug reform will be very far from realized.

Dr. Albert Schneider suggests that this committee, of which he is a member, consider the following matters:

1. The efficiency of macroscopical and microscopical inspection in determining the purity of crude and powdered vegetable drugs.
2. The efficiency of chemical examination of vegetable drugs.
3. The determination of a practical standard of purity for the more important vegetable drugs.
4. The determination of an age limit for vegetable drugs.
5. The determination of the exact commercial source of the most important drugs.

While the investigation of these questions is not necessarily comprised in the work of this committee, the results of such investigation would be of great value in the work of drug reform.

Dr. Schneider and Prof. Howell have both emphasized the need for governmental encouragement of the propagation of drug plants, especially through experimentation. Dr. Schneider, for the reason that the United States would, by increased domestic production, be made independent of the fluctuations and variations of foreign supply, and Prof. Howell for the reason that the present methods of gathering the wild plants is rapidly bringing many species to extinction.

Letters received by this committee indicate that some of the members of the association wish to restrict the advertising of medicines by persons not qualified to manufacture and dispense them. The only suggestion for such restriction which the committee is able to make is that this restriction might be provided by amendment of the State Pharmacy Laws—the same laws which compel physicians and pharmacists to prove *their* qualifications. Legal opinion sought in regard to such an amendment has been favorable to it. More effective still would be proper restriction of the use of the U. S. mail.

Prof. Howell has collected advertisements of cancer, morphine, cocaine, and whiskey cures, and has calculated the percentages of newspaper space devoted to them. This material, it is hoped, will be ready for submission at the meeting of the association.

J. L. Conant, Jr., Secretary of the Idaho State Board of Health, has suggested that the committee draft a model drug law for adoption by every State in the union. This work would probably encroach on the duties of the committee on National and State Legislation. At any rate the association should make some provision for this work, by instructing one or more committees to carry it out, for the enactment of uniform drug laws is of almost as much importance as the co-operation of the officials provided for their execution.

While the committee on Drug Reform has not drafted a model law, it wishes to call attention to the analysis of the Federal Food and Drugs Act by a committee of the Maryland State Board of Health. The Food and Drugs Bill drawn up by this Maryland committee for submission to the legislature of that State follows the National Act except for certain alterations. One of these is the provision that substandard drugs, in addition to the statement of their own standard, must bear the further statement that *they are not intended for medicinal use, and are not to be used in the filling or compounding of any prescription or order of any registered physician, dentist, or veterinarian.*

ian. In the opinion of the Maryland committee, "The use of substandard drugs for medicinal purposes is unnecessary, dangerous, and contrary to public policy."

A recent change in the Pennsylvania law in regard to substandard drugs, allows a deviation, if stated on label, in all drugs except Opium, Iodine, Peppermint, Camphor, Ginger, and Ethyl Nitrite. These six drugs must conform strictly to the U. S. P. Standard (Pa. Act of May, 1909, Section 3).

The Maryland committee also struck out the guaranty clause of the National Act. They are of the opinion that it would emasculate the entire bill, since the State, outside its limits, would have no jurisdiction over manufacturers or wholesalers by whom most of the guaranties to Maryland jobbers and wholesalers would be given. The committee states: "The Government of the United States grants exemption only to the jobber and retailer when its jurisdiction can reach the manufacturers: the State should do likewise." The committee finally decides, however, that no guaranty at all should be provided for by the State, since exemption in the case of drugs manufactured within the State, would discriminate against those persons who might prefer, or be forced, to obtain drugs from without.

This committee believes that the association can aid the work of law enforcement by creating a separate division of the scientific section to consist of all those who are especially interested in analyses with reference to the different drug laws—a division which would convene on a special day each year to determine and unify processes and standards and to compare results. It would, in short, be a clearing house for drug inspectors and analysts. At the last meeting of the American Chemical Society, a special section was formed which includes drug analysts. It seems to this committee that our own association is a more natural center for such work.

The present members are of the opinion that the Committee on Drug Reform should be made a standing one. The absurdity of trying to accomplish actual reform in a few months is evident. Practical results can be obtained only by a permanent committee.

ALBERT SCHNEIDER, San Francisco, Cal.

E. V. HOWELL, Chapel Hill, N. C.

L. E. SAYRE, Lawrence, Kan., *Chairman*.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION—TUESDAY AFTERNOON, MAY 3, 1910.

The Section was called to order at 3:15 p. m. by Chairman M. I. Wilbert, of Washington City.

The Chair stated that quite a long program had been prepared, and in addition to the numerous list of papers appearing on the program, the section had before it eight other papers. He stated that when the committee started out to compile the program, the contributors were told that an effort would be made to get the section to adhere to the program, and unless the majority of the members objected, that rule would be followed. Where contributors were not present, their papers would be read by title only, and contributors not on the program would have to bide their time, and the Section would consider as many of their papers as possible after the regular program was finished.

The chair then called on Mr. W. O. Richtmann, of Florida, Associate on the Committee, to take the chair while he read his address, which he then proceeded to present as follows:

CHAIRMAN'S ADDRESS.

Precedent has established for the Chairman of this Section the privilege to present an address on matters that he may deem to be timely, thus giving him an opportunity to outline or suggest lines of investigation that, in his opinion, would prove to be fertile fields for work.

In taking advantage of this opportunity, I desire to present to you some personal opinions and suggestions on the fields of inquiry and of policy that I consider to be opportune, if not imperative, should we desire to leave for future generations of pharmacists a heritage that they can feel proud of and an example that they may well choose to follow.

THE PHARMACIST AND THE PUBLIC HEALTH.

During recent years, we, the people of this American Republic, have been awakened to the desirability of conserving our natural resources so as to avoid, if possible, the continuance of the all but criminal waste that has been going on in nearly every section of our country.

As a direct outcome of the resulting agitation it has been conclusively shown that the loss of human energy, through morbidity and mortality by preventable diseases, constitutes by far the greatest waste of our present resources. Even when measured by the popular, utilitarian standard of dollars and cents, the money value of this loss far exceeds that of all other known losses combined.

Physicians individually and collectively have devoted considerable thought, time and money to the study of the problems that are involved and for upwards of half a century they have been agitating, more or less effectively, for the adoption of measures designed to prevent the spread of communicable diseases, and thus promote the well-being and the longevity of human kind.

It would be altogether too far-reaching to review at length the splendid work, in the line of the prevention of communicable diseases that has been accomplished during the past half-century or more. The knowledge that has been gained concerning tuberculosis, yellow fever, enteric fever, malaria, bubonic plague and cholera, not to mention trypanosomiasis, ankylostomiasis and numerous other communicable diseases, has enabled medical men to indicate clearly the precautions that are necessary to prevent the unnecessary spread of these diseases, or to eradicate them entirely. How really efficient these sanitary measures are in practice has been well demonstrated on the Isthmus of Panama where the Sanitary Department of the Isthmian Canal Commission has practically eliminated tropical diseases from a reputed pest-ridden region.

Even the non-medical social economist realizes that disease and premature death constitute important inhibiting factors to human progress, and that the nation that can rid itself of these impediments most successfully is destined to lead the world in other respects.

While medical men have taken an active part in laying the foundation for future activities in sanitary science and preventive medicine, we, as pharmacists, have neglected our opportunities, and, as a class, at least, have done little more than occasionally endeavor to utilize the result of published work in the exploitation of proprietary medicines of questionable value or use.

This perversion of scientific work on the part of the followers of our craft is perhaps one of the most serious charges that have been made against pharmacy as a calling. The accusations that have been laid at our doors in this connection appear all the more justified when we remember that our present-day knowledge of medicines and their uses is as yet woefully imperfect, and that, as pharmacists, we have been particularly backward in recognizing the limitations of medicines, and the possible harm that may result from their abuse. Many of us are as yet unwilling to admit that the science of the chemist and the art of the physician are far indeed from having reached that state of perfection where the needs of the animal organism can readily be determined or the effects of any given substance on the pathologic condition foretold with any degree of accuracy.

While it is true that the art of synthesis may and probably will add valuable medications to our store of remedial agents, it is a grave question indeed whether the results so far achieved are not to be deplored rather than lauded, whether the lives unduly shortened do not actually outnumber the lives that have been prolonged by the all too liberal use of the products of the tar barrel.

In how far we as pharmacists are to be held responsible for the harm that has been and is being done by these remedies is not to be determined at the present time. Certain it is that our indifference to ultimate results is largely responsible for many of the present as well as past abuses in connection with so-called synthetic remedies and many of the other physiologically active drug products.

As a class, we have become so indifferent to the every-day use of drugs that we do not always fully appreciate the possibility that even the continued use of saline cathartics, or any one of the widely advertised purgative mineral waters, may do harm directly, by

further developing a tendency to spastic constipation, and, indirectly, by masking for a time symptoms that may prove to be the early indications of more than serious disorder.

It has been asserted, and with much evidence of truth, that, as a class, we pharmacists are altogether too numerous and that our very numerousness is a menace to the public health. To the impartial observer existing conditions in the drug business are indeed disheartening, and particularly so when he compares the sum total of the persons engaged in the various lines of the drug business with the total membership of the societies and associations that are devoted to the development of the sciences relating to pharmacy. Nor will his disappointment be modified by remembering that apart from physicians in active practice, no class of men could exert a more beneficent influence on the development of public health work than the practical pharmacists who supply the medicines used in the community and who should, at least, safeguard their abuse.

Our failure to take the place that we really should, in the development of the sciences relating to medicine, is due to a combination of a number of pernicious influences that might readily be summed up by the one word, commercialism. As a class we have been ground between the upper and nether millstones of expediency and necessity; we have been misled by false prophets and have in turn refused to consult with our fellow-practitioners for fear that they were desirous of utilizing us for the promotion of their individual schemes or purposes. As we have increased in number we have decreased in weight or influence, and altogether we appear to have too much in common with that class of medical practitioners whose mentality is described by Dr. Osler as being suggestive of that little dried up miniature of humanity, the prematurely senile infant whose tabetic marasmus has added old age to infancy.

LOST OPPORTUNITIES.

Five years ago the then chairman of this section, Mr. E. H. Gane, presented an able review of the needs of American pharmacy and the desirability of adopting a more aggressive attitude in dealing with pharmaceutical problems. He pointed out that one by one the legitimate scientific sidelines of pharmacy have passed into other hands, largely, perhaps, through lack of co-operation on the part of the various agencies that should have been of assistance in maintaining the professional status of the pharmacist.

At that time he, very properly, pointed out that the pharmacist should lead in knowledge of drugs, their behavior and the best methods of presentation. It should be his part to make practical applications of the results of scientific research, to aid in replacing crude drugs by definite principles and to urge the abandonment of unscientific and inert products. He warned against the further usurpation of the functions of the pharmacist by official chemists and dairy commissioners and called attention to the formation of the then newly organized Council on Pharmacy and Chemistry of the American Medical Association. He pointed out that the work that was being undertaken by this Council should have been inaugurated by the American Pharmaceutical Association and urged that the latter association make immediate provision for co-operating in the work of the Council on Pharmacy and Chemistry of the American Medical Association.

The warnings voiced by Mr. Gane five years ago were practically disregarded, and even the more significant admonitions reflected by the enactment of Federal and State pure food and drug laws have been practically ignored by the rank and file of pharmacists not directly engaged in doing an interstate business.

Opportunities once lost can never be regained, and our failure to take advantage of the suggestions offered by Mr. Gane five years ago lost to pharmacy the opportunity of taking an active part in a movement that has already done much to rid medicine of at least some of the deception and fraud practiced knowingly or in ignorance by men who claim affiliation with our ranks.

THE COMING REVISION OF THE U. S. P.

Just at the present time we are confronted with differences of opinion regarding the scope and content of the one book that has been the direct or the indirect cause of much of the proprietary medicine abuse under which the professions of medicine and pharmacy are now suffering. This book, the Pharmacopœia of the United States of America, is about to be revised and the U. S. P. Convention, which is to assemble in the city of Washington on May 10, is to decide definitely on the policies that are to be followed in revising it.

It goes without saying that unless the coming revision of the U. S. P. can be brought in line to meet the requirements of the hour, the U. S. P. IX will be as far from proving to be a panacea for our proprietary medicine ills as was the U. S. P. V. or any one of its successors.

Much of our time at this meeting will be devoted to the consideration of problems bearing more or less directly on the possible development of the U. S. P. along lines that will tend to make it more acceptable, as a standard for the identity and purity of the articles it describes, as a dependable guide in making the preparations enumerated in its pages, as a reliable basis for the teaching of materia medica in medical schools and as an authoritative source for medical prescribing by competent and sane physicians.

The Pharmacopœia could, and in my opinion should, be an important factor in advancing rational drug therapy, and thus assist in eliminating the inevitable sequence of the ignorant or uncertain use of drugs which leads to therapeutic nihilism, on the one hand, and hopeless drug addiction or quackery, on the other.

I believe that if we can restrict the Pharmacopœia to articles, the identity, purity and activity of which can be controlled and in a way guaranteed, there would be some promise of a more rapid development in our materia medica than has been evidenced during the past three or four decades; a period during which many of the other sciences relating to medicine have made unprecedented progress. You will, no doubt, agree with me that the Pharmacopœia of the United States should be accurate in its statements, and that the information contained in its pages should be positive. If this were done, there would be no need for supplements to the Pharmacopœia nor would there be need for revising the work more frequently than every ten years.

It might be deemed advisable to issue a supplement including new remedies, but even this would be really unnecessary in view of the annual publication of N. N. R., which is being widely accepted as a dependable source of information regarding new and non-official remedies. For other extra-pharmacopœial articles the National Formulary and the proposed book on unofficial standards, now in course of preparation by the American Pharmaceutical Association, could readily be developed to provide the necessary descriptions and standards for every article that has been or will be used as medicine.

THE COMING ERA.

In practically all countries of the civilized world the National Pharmacopœia is recognized as being a potent factor in the maintenance of the public health and in promoting a practical knowledge of medicaments and their limitations. Up to within a very recent period little or no attention has been devoted, in this country, to a scientific or systematic study of drugs and their uses. With the increase in number of pharmacologic laboratories, however, there has come an appreciation of the possibilities of work of this kind.

Among the more progressive colleges of medicine even now, pharmacology is receiving the attention that is rightfully due it, and there can be no doubting that the work of such men as Abel, Cushny, Hunt, Sollmann, Hatcher, Edmunds, Hale, Wood, Jr., Crawford, Salant, Houghton and others is destined to bring about a decided innova-

tion in American medicine that will, in time at least, entail a corresponding change in American pharmacy.

Whether we care to acknowledge the fact or not, there is no mistaking the indication that we are on the eve of a decided change in ideas, methods and requirements in our own field of work, and it behooves us to take heed of the warnings.

For two or three years we have heard numerous platitudes on the resources of the U. S. P. and the N. F., and the desirability of restricting medical prescribing to the articles enumerated in these books. Sollmann in his comments on the present-day U. S. P. and N. F. propaganda points out that while there are rather more good remedies and fewer bad ones in the Pharmacopœia than there are out of it, the book itself is not a dispensation and can in no way take the place of brains either in prescribing or dispensing.

He also points out that physicians do not need more new drugs or more preparations of old drugs, but they do need to know more about a few drugs and how to use them with exact methods.

At a recent meeting of the City of Washington Branch of the American Pharmaceutical Association it was pointed out that the time to teach medical men how and why to use medicines is during the student period, and that this cannot be done effectively unless there is some generally recognized list of really valuable remedies.

It has been repeatedly pointed out that the U. S. P. enumerates drugs and preparations that are not only unnecessary but even objectionable, in that they lead to misleading statements in the exploitation of proprietary remedies or to the habitual use of fixed formulas by physicians in place of the guarded and scientific use of active medicaments.

With the work of the laboratory worker in pharmacology to point the way there is no longer any reasonable excuse for retaining inert or useless medicaments, providing we are willing to accept a reliable check on blind experience, so far as activity of medicinal substances is concerned.

In the future, let us hope in the very near future, the requirements for admission to the accepted list of best medicaments will be based on keen observation and positive knowledge, and that pharmacists, as such, will be among the first to recognize the validity of the requirement that the Pharmacopœia be the accepted list of the best remedies that are available.

While there are at present many and varied opinions as to what the U. S. P. IX should be, I trust that we will be able, in the course of the sessions of this section, to discuss the question temperately and at length. I trust that our conclusions will be based on scientific reasoning, and that they will be acceptable to the Pharmacopœial Convention and followed by the incoming Committee of Revision.

Let us ever remember that "The fruitful field of to-day is ours to work in, with the heritage of the past to guide us and the unknown possibilities of the future to lure us on to ever-increasing efforts to accomplish our daily tasks and to leave for generations yet unborn a field more fruitful and productive for the part that we have taken."

Action was called for on the Chairman's address, and on motion of Mr. Hallberg, seconded by Mr. Asher, it was ordered received, to take the usual course.

Mr. Wilbert resumed the chair and called for the reports of committees as the next business in order, and designated the Committee on Ebert Prize as the first to report. Mr. C. E. Caspari presented this report as follows:

REPORT OF COMMITTEE ON EBERT PRIZE.

Your committee begs to report that, in its opinion, the Ebert Prize should be awarded to H. M. Gordin for his paper on "The Crystalline Alkaloid of *Calycanthus Glauca*."

HENRY KRAEMER,

A. B. STEWART,

CHARLES E. CASPARI, *Chairman*.

Mr. Caspari explained that the decision of the committee was reached after considerable correspondence, and upon taking into consideration not only the paper which was presented by Mr. Gordin at the last annual meeting of the Association, but all those which had appeared for several years previously.

Mr. Hallberg suggested that Mr. Gordin's papers on this same subject had been presented to the American Chemical Society, and asked if he was liable to be awarded a prize by that Society also. He was also not entirely satisfied that this prize award had been made within the spirit of the prize-fund condition; he had so expressed himself at the Los Angeles meeting last year, and now, after having looked into the matter, he was convinced that his objection last year was correct, and he would like to ask the chairman of the committee if they had carefully reviewed the terms of the Ebert Fund as established.

Mr. Caspari replied that the committee had carefully considered the conditions of the award, and while the reward might not be in accordance with a very strict interpretation of the conditions laid down as applying to the prize, at the same time he did not think the committee had varied materially from its conditions. As to the publication of these papers in the *Journal of the American Chemical Society*, he was quite sure that all these papers, with the possible exception of one, had been read before this Association before publication by the American Chemical Society, and if that Society chose to award a prize after the papers had been read before this Association, it was "up to them."

Mr. Hallberg, said, that with this explanation, he would withdraw his objection.

The Chair thereupon declared the report of the committee approved as read.

The report of the Committee on Drug Market was called for, and Chairman Patch made the following report:

REPORT OF THE COMMITTEE ON DRUG MARKET.

Your committee have had a very brief interval since notice of their appointment, and cannot submit a very extended report.

Since the last meeting several observers have called attention to the wide range of results obtained in conducting alkaloidal assays. Dr. A. B. Lyons gives the results obtained by nine chemists assaying aconite root by market samples of extract of *nux vomica* presumably assayed by the various manufacturers, and labeled to contain 5 per cent. strychnine, to actually assay from 4.32 to 7.2 per cent., and nine samples of fluidextract of

belladonna leaf labeled to contain 0.3 per cent. alkaloid to assay from 0.25 per cent. to 0.39 per cent. This is not a very complimentary result after having had a number of years' experience with the methods used. Dr. Dohme has confirmed the statements of other observers, that there is no rapid deterioration in preparations of alkaloidal drugs, excepting in the case of coca, aconite and physostigma, while the change in these is not appreciable within six months.

It has been demonstrated that phosphorus is not a practical ingredient for tablets, as it rapidly oxidizes and is lost. On the other hand, dispensed in a proper pill mass it remains unchanged for a long interval of time.

Reports of convictions in different sections demonstrate that due care is not exercised in making simple pharmaceuticals. Preparations that are simple solutions, like tincture of iodine, spirit of camphor, liniment of camphor, spirit of anise, spirit of peppermint, etc., have been found of only 10-16 the official strength. In many cases it is absurd to think deliberate wrongdoing was practiced. Some of the most reputable and painstaking druggists have been convicted, and the only possible explanation has been carelessness on the part of their assistants in making the products. In many cases it is hard to believe that the proprietor would deliberately sell a preparation below strength under any circumstances, and the sale of the article in question is so limited and the saving in cost so immaterial that there is a total absence of motive.

We notice convictions from the sale of mercurial ointment under strength. In one case the product was made by the leading manufacturing chemical house of the country and afterward assayed by a distributing house and pronounced to be 50 per cent. mercury, or U. S. P. It had stood in a warm place and softened, permitting the mercury to separate, and the druggist had not taken pains to triturate to uniform condition before dispensing. This plea could not be accepted by the health authorities, particularly as they had a sample that had not separated under similar conditions of temperature. Unfortunately they were misled, as the product used for comparison was not U. S. P., but had part of its lard replaced by wax to enable it to stand summer temperature better.

Acetic fluidextract of bloodroot is a source of annoyance on account of variability. Samples of drug assayed 4.06, 5.32, 4.48, 5.46, 5.6, 5.16, 5.04, 4.9, 5.6, 6.16 per cent.

Flect. U. S. P. '90, with no special precautions, assays over 3 per cent, flect. 1900 acetic from some drugs will assay 3.5 per cent., but other lots of drug containing much resin will not yield the alkaloid to the aqueous acetic menstruum. A lot of drug assaying 5.6 per cent. percolated with large excess of acetic menstruum, and concentrated, gave a product loaded with extractive assaying only 1.96 per cent. The residual drug, dried and assayed, gave 4.06 per cent. alkaloid.

The necessity for the examination of products made by the best houses is seen in the fact that a lot of potassium bromide was distributed assaying only 47.05 per cent. of potassium bromide, while it contained in addition 47.04 per cent. sodium bromide and 5.91 per cent sodium chloride.

It is plainly evident that this mixture would not have been shipped intentionally, as its cost would be more than that of potassium bromide. On return of the product the shippers practically confirmed above assay.

H. H. Rusby expresses the conviction that there is not one-tenth the adulteration as was found five years ago. He instances the case of a large Eastern drug house recalling its stock in the hands of retailers and jobbers and substituting it by other stock. Examination of this recalled stock revealed its adulteration by the addition of foreign matter.

The presence of stems and other impurities in drugs has been largely ignored by the U. S. P. It is plain enough that when the woody tissue of a drug is inert the inclusion of a large percentage of woody stem is quite as active in degrading the activity as the addition of sand, sawdust or olive pits.

Nomenclature devices.—Since the government has prosecuted dealers for selling powdered colocynth containing the seeds, the practice has come into vogue of selling the same labeled "Colocynth apple." It is hardly likely that any pharmacist would reject a shipment because it was so labeled. The dealers, however, declare that the name "Colocynth apple" is not in the Pharmacopœia and that they may adulterate it as much as they choose. A similar case is the sale of male fern containing all its chaff and other refuse, the word "natural" being added after the title *Aspidium*.

The following table covers items reported upon to date.

Acid Citric.

Frequently contains free sulphuric acid equivalent to 1 per cent. or 1.5 per cent. of citric.

10 barrels assayed 99.05 per cent. to 100 per cent. No sulphuric acid. E. L. Patch.

Acid Hydriodic dilute.

Often contains excess of potassium bitartrate; often 10 per cent. W. L. Scoville.

Acid Lactic.

Quite a difference is found between hot and cold trituration.

Sample 1. Cold trituration.	Boiling temperature.
73.69 per cent.	86.4 per cent.
72.78 per cent.	86 per cent.
72.46 per cent.	87.1 per cent.
73.16 per cent.	86.59 per cent.
73.63 per cent.	87.05 per cent. E. L. Patch.

Aconitine.

Varies in physiological test from 1 in 450,000 to 1 in 650,000. W. L. Scoville.

Ammonia Water, Stronger.

Bought near the source of manufacture often runs above 28 per cent. Shipped any considerable distance, especially in warm weather, runs between 26 per cent. and 28 per cent. W. L. Scoville.

30 carboys assayed from 25.91 per cent. to 30.48 per cent. All had some empyreumatic odor on neutralizing. Only C. P. product readily answers U. S. P. test. E. L. Patch.

Asafetida.

Pharmacopœial product is rarely obtainable, although better grade than formerly.

The crude should be replaced by purified product and the powdered drug excluded from use. One sample contained 19.25 per cent. alcohol-soluble matter and 44.4 per cent. ash. Was heavily adulterated with chalk. E. H. Gane.

There has been constant improvement in quality until within the past two months when there has been a sudden renewal of heavy adulteration by the addition of sand or ground rock. Possibly this has been done to create the impression that a good asafetida cannot be obtained and influence the committee on revision in favor of lower standards. New and effective adulterants consisting of gummy matter closely resembling the drug in appearance, have resulted from the peculiar U. S. P. requirements regarding ash, which do not agree with those regarding solubility. The addition of these gummy matters is worse than that of inert matter and necessitates the visit of a competent investigator to the region of collection of this drug. H. H. Rusby.

Asafetida.

5 lots of powdered assayed :

Alcohol soluble.	Ash.
41 per cent.	36.5 per cent.
53 per cent.	26.5 per cent.
66 per cent.	22.5 per cent.
66.5 per cent.	23.5 per cent.
63.5 per cent.	23 per cent.

Balsam Peru.

Is misbranded because it does not come from Peru. The sulphuric acid and lime tests are unreliable. A test should be had for the so-called synthetic balsam. The Dietrich test works well. E. H. Gane.

Sample 1. Sp. gr., 1.146; cinnamein, 61.6 per cent.; acid resin required 2.25 semi-normal potassa solution. Sample 2. Sp. gr., 1.145; cinnamein, 58 per cent.; acid resin, 2.20. E. L. Patch.

Belladonna Leaf.

The quality is greatly improved. The usual assay is around $\frac{1}{2}$ per cent. The addition of scopola leaves still continues. The upper portion of the belladonna stem, not exceeding $\frac{1}{4}$ inch in thickness, is quite as rich in alkaloid as the leaves. H. H. Rusby.

5 lots assayed 0.3 per cent., 0.38 per cent., 0.4 per cent., 0.31 per cent., 0.2 per cent. The last contained a considerable admixture of other leaves and belladonna. It is still difficult to obtain a leaf assaying $\frac{1}{8}$ per cent. alkaloid. The amount of extractive in the leaf is often so great as to make it impossible to prepare solid extract of official strength. E. H. Gane.

All samples of the leaf assayed met 0.3 per cent. or better. Only one assayed 0.35 per cent. A. H. Clark.

Assayed from 0.26 per cent. to 0.27 per cent. E. L. Patch.

9 samples of fluidextract of belladonna leaf labeled to assay 0.3 per cent. assayed from 0.25 per cent. to 0.39 per cent. C. Koch.

Belladonna Root.

The presence of poke root in this drug has practically ceased, and it has been gradually improved in character from every point of view. H. H. Rusby.

3 lots assayed 0.44 per cent., 0.49 per cent., 0.485 per cent. E. L. Patch.

Benzoin.

A definite limit of solubility in warm alcohol should be given. 20 per cent. insoluble in alcohol is not excessive in good samples of Sumatra benzoin. 2 samples of exceptionally fine quality gave 93.65 per cent. and 92.65 per cent. soluble in alcohol, with ash 1.05 and 0.70. E. H. Gane.

Different lots assay from 74.5 per cent. to 87.5 per cent. alcohol-soluble. W. L. Scoville.

Cacao Butter.

Varies in melting-point from 32.5° to 38° centigrade. Enough to make trouble in suppositories of varying composition. W. L. Scoville.

Calamine.

The original native product is no longer to be had. Mixtures of barium sulphate colored with iron oxide have taken the place of the genuine. Sometimes a little oxide of zinc or carbonate of zinc has been added, and sometimes the color has been an aniline color. As there is considerable call for this, would suggest the adoption of formula by the trade, that of the British Pharmaceutical Codex, for the fictitious product, being satisfactory. E. H. Gane.

Calcium Phosphate, precipitated.

None can be had strictly pharmacopœial. The majority of houses state that they can supply technical only. The assay of this product is from 1.1 per cent. to 4 per cent. chloride. A lot labeled 2 per cent. chloride assayed 3.9 per cent. The best lot obtainable, guaranteed to be U. S. P., had 0.5 per cent. chloride. E. L. Patch.

Camphorated Oil.

Of 208 samples 107 were below the standard. The entire lot ranged from total absence of camphor to 27 per cent. Conn. Agri. Experiment Station.

8 samples assayed 3.4 per cent., 10.4 per cent., 19.6 per cent., 20 per cent., 20 per cent., 20 per cent., 21.4 per cent., 23.8 per cent. A. M. Alley.

Caraway Seed.

Has been offered practically free from oil. Pharmaceutical Era.

Saigon Cassia.

Is adulterated with what resembles Winter's Bark. Pharmaceutical Era.

Catechu.

88 per cent. soluble in alcohol, 3 per cent. ash; 68 per cent. soluble in alcohol, 3 per cent. ash. E. L. Patch.

Cerium Oxalate.

The commercial article is of very varying composition. One must specify the pure to get the proper product. E. H. Gane.

Ceresin.

Varies in melting point from 58° to 65° centigrade. W. L. Scoville.

Lots of clove have been found mixed with clove stems and freed from oil. Pharmaceutical Era.

Cochineal.

2 samples 5 per cent. ash and 8.2 per cent. ash. E. H. Gane.

Cochineal Silver.

22.5 per cent. ash; Black, 6 per cent. ash. E. L. Patch.

Colchicum Seed.

0.52 per cent., 0.56 per cent., 0.52 per cent. E. L. Patch.

Colchicine.

4 lots melted at 116°, 119°, 122°, 126° centigrade. Evidently pure colchicine is not easily obtained in commercial quantities. W. L. Scoville.

Colledion.

One lot of flexible contained but 75 per cent. of the required amount of solids. E. L. Patch.

Cream of Tartar.

4 samples. 2 adulterated. Mass. State Board of Health.

Digitalis.

Much poor foxglove offered for import and the clashes between importers and inspectors have been numerous. Owing to the sensitive nature of the constituents of the drug, even a little carelessness in drying or preserving can result in great damage. The importers and large dealers are mostly quite innocent of all traces of knowledge concerning such matters, so they cannot understand why a drug should be rejected which is merely "off color" or "just a little blackish." H. H. Rusby.

Echinacea.

Substituted by spurious root, possibly parthenium. John Moser.

Elm Bark.

10 samples. One was adulterated with wheat starch, one with corn starch, eight were pure. P. P. Mitchell.

Goldenseal.

2 lots, 3.1 and 2.7 hydrastine. E. H. Gane.

Of 30 samples only one was below 2.5 per cent. Most were below 3 per cent., some 4 per cent., one 4.5 per cent. A. H. Clark.

Guaiac.

One sample, a fine clear gum, was 98.65 per cent. alcohol-soluble and contained only a trace of ash. E. H. Gane.

Guarana.

4 lots: 4.4 per cent., 4.2 per cent., 4.5 per cent., 3.7 per cent. E. H. Gane.

Heroin.

The genuine varied in melting from 164° to 171° centigrade. W. L. Scoville.

Honey.

Adulterated with glucose, invert sugar, colored with coal-tar dye. Pharmaceutical Era.

Hyoscyamus.

There has been a great improvement. Now it is far more common to find it yielding 0.12 and 0.15 than below 0.08. H. H. Rusby.

5 lots assayed 0.051, 0.074, 0.044, 0.060. Two of the lots were annual leaf. E. H. Gane.

4 lots assayed 0.086, 0.0505, 0.0584, 0.0669. E. L. Patch.

Insect Powder.

Adulterated with ground stems and not ground from flowers only, as it should be.

One sample from one of the largest pharmaceutical manufacturing houses was composed wholly of ground stems. Such products are sold below the cost of the genuine. E. H. Gane.

Iodine, Tincture of.

58 samples ranged in iodine content from 1.27 to 8.8 Gm. in 100 Cc. and in potassium iodide content from 1.06 to 8.9 Gm. in 100 Cc. L. D. Havenhill.

Of 49 samples 17 were below the standard. Conn. Agri. Exper. Station.

3 samples were 49 per cent., 56 per cent., 58 per cent. of the pharmacopoeial standard. Mass. State Board of Health.

Ipecac.

2 samples assayed below 1.75 per cent., 3 below 2 per cent. 6 above per 2 cent. A. H. Clark.

8 lots assayed 2.18, 2.33, 2.28, 2.4, 1.97, 2.26, 1.97, 2.4. E. L. Patch.

4 lots assayed 1.05, 2.1, 2.22, 2.19. E. H. Gane.

Reduced Iron.

11 samples assayed over 90 per cent., 7 contained sulphide, all were free from arsenic. L. O. Tayntor.

All lots assayed from 90 per cent. to 97 per cent. W. L. Scoville.

Jalap.

12 lots assayed 9.78, 10.79, 8.17, 8.30, 10.30, 11.14, 7.72, 17.42, 7.19, 10.9, 7.91, while 8 bags of new crop assayed 23.88 per cent. resin with only 1.25 per cent. ether soluble. This wide variation shows the advisability of using the resin in place of the powdered drug in official preparations. E. H. Gane.

Lemon Extract.

82 samples examined. 29 adulterated or below standard. 25 illegally labeled. 1 sample contained wood alcohol. Conn. Agri. Exper. Station.

Licorice Powd. Ext.

1 lot consisted almost entirely of caramel, probably due to excessive heat in evaporating and drying. E. H. Gane.

Litharge.

Often contains small amounts of red lead. W. L. Scoville.

Lupulin.

1 lot contained 20.5 per cent. sand. E. H. Gane.

Mercurial Ointment.

3 samples were only 26.6 per cent., 9.12, 26.87 per cent. of official strength. Mass. State Board of Health.

Myrrh.

Much of the whole gum imported contains a varying proportion of gum acacia, probably due to careless collecting. E. H. Gane.

Of 7 lots the alcohol solubility ranged from 35 to 44.7 per cent. W. L. Scoville.

Mustard.

1 lot was colored with Martius yellow and adulterated with capsicum. Pharmaceutical Era.

Nux Vomica.

Is adulterated with powdered olive pits, also with filings of the nut of *phytelephas macrocarpa*, the corajo or vegetable ivory. Pharmaceutical Record.

9 lots assayed 0.96, 1.16, 0.93, 1.25, 1.24, 1.28, 1.22, 1.23, 1.19 per cent. strychnine. E. L. Patch.

9 samples extract of *nux vomica* labeled U. S. P. standard 5 per cent. strychnine, assayed from 4.32 per cent. to 7.2 per cent. Christopher Koch.

Cottonseed Oil.

One barrel was mixed with Soya bean oil. Owing to the high price of cottonseed oil immense quantities of Soya bean oil have been imported and in many cases used for the former. E. H. Gane.

Oil of Eucalyptus.

5 out of 7 lots had 75 per cent. to 79.5 per cent. cineol. One lot only 50 per cent. W. L. Scoville.

Oil of Lemon.

Under present regulations it is impossible to admit oils adulterated with washed or exhausted oil of lemon or C. P. citral. Geo. Leuders.

The washed oil is a very poor product. Seems to be lemon oil from which the citral has been largely extracted. It has sp. gr. 0.843, rotation, + 60° 25'. E. H. Gane.

Oil of Lavender.

2 samples test as follows: Sp. gr., 0.896; rotation, — 4° 35'; refraction index, 1.464; linalyl acetate, 40.56 per cent.

Sp. gr., 0.891; rotation, — 5° 45'; refraction index, 1.4648; linalyl acetate, 29.54 per cent. E. H. Gane.

Olive Oil.

16 samples contained cottonseed oil. One contained 90 per cent., one was 100 per cent. cottonseed oil. Mass. State Board of Health.

Green olive oil is frequently a very inferior quality, at times containing over 40 per cent. of free fatty acid calculated as oleic.

Some dealers have reported this grade of olive oil adulterated with red oil, but a high acid number alone is not proof of this admixture. E. H. Gane.

Sample of Malaga olive oil contained cottonseed oil. Other samples stood all U. S. P. tests. Saponification value, 191.2; iodine number, 84.41. E. L. Patch.

Oil of Pennyroyal.

2 samples, sp. gr., 0.919; rotation, + 9°; sp. gr., 0.922; rotation, + 8° 50'.

Both had poor odor. E. H. Gane.

Oil of Rose Geranium.

There is a very wide variation in the oil of commerce. 4 samples from large importing houses gave the following results: Sp. gr., 0.906; rotation, — 7° 5'; acid no., 9.19; geranyl tiglate, 26.2 per cent.; residue on evaporation, 7.75 per cent.

No. 2. Sp. gr., 0.892; rotation, 7°; acid no., 5.57; geranyl tiglate, 20.2 per cent.; residue on evaporation, 3.5 per cent.

No. 3. Sp. gr., 0.901; rotation, — 7° 5'; acid no., 6.96; geranyl tiglate, 19.4 per cent.; residue on evaporation, 6.35 per cent.

No. 4. Sp. gr., 0.905; rotation, — 8°; acid no., 22.3; geranyl tiglate, 22.6 per cent.; residue on evaporation, 8.05 per cent. E. H. Gane.

Gildemeister & Hoffman give for French oil—sp. gr., 0.897 to 0.905; rotation, — 7° 30' to — 9°; geranyl tiglate, 25 per cent. to 28 per cent.

African or Algerian oil—sp. gr., 0.892 to 0.90; rotation, — 6° 30' to 10°; geranyl tiglate, 19 per cent. to 29 per cent.

Spanish oil—sp. gr., 0.897; rotation, — 10° to 11°; geranyl tiglate, 35 per cent. to 42 per cent.

Oil of Tar.

A product meeting the U. S. P. requirements is not obtainable. A more accurate definition of just what is intended by the official description of oil of tar is required.

All sorts of products are sold as oil of tar, as the following figures show:

Sample 1. Color reddish-brown. Odor good. Sp. gr., 0.996; 40 per cent. distils between 315° and 444° Fahr.

Sample 2. Color almost black. Odor tarry. Sp. gr., 1.044; 40 per cent. distils up to 450° Fahr.

Sample 3. Color black. Very thick. Odor tarry. Sp. gr., 1.044; 25 per cent. distils up to 400° Fahr. Balance thickens and does not distil.

Sample 4. Color black. Very thick. Odor poor. Sp. gr., 1.012; 30 per cent. distils below 420° Fahr. Balance thick, solid on cooling. (New Orleans tar oil.)

Sample 6. Color light brown. Odor good. Sp. gr., 0.963; 70 per cent. distils below 370° F. Sold as crude tar spirit.

Sample 7. Color light brownish-red. Sp. gr., 0.861; 60 per cent. distils below 350° F. Sold as light tar oil.

Sample 8. Color reddish-brown. Odor good. Sp. gr., 0.958; 75 per cent. distils below 400° F.

Sample 9. Color brown. Odor good. Sp. gr., 0.977. 80 per cent. distils below 420° Fahr. E. H. Gane.

Papain.

Sample 1. 1 part digests 12.25 parts of dry fresh beef fibrin in neutral solution. 17 parts in alkaline solution.

Sample 2. 15.35 parts in neutral solution, 17.8 parts in alkaline.

Sample 3. 14.7 parts in neutral solution, 19.1 parts in alkaline.

Sample 4. 15.5 parts in neutral solution, 19 parts in alkaline. E. L. Patch.

Pepsin.

Usually of good quality and digestive power. One lot examined tested less than 1 to 1000.

Podophyllin.

	<i>Insol. in Alcohol.</i>	<i>Sol. in Chloroform.</i>	<i>Sol. in Ether.</i>
Sample 1.	1.01 per cent.	66 per cent.	75 per cent.
Sample 2.	2.3 per cent.	58 per cent.	56 per cent.
Sample 3.	1 per cent.	73 per cent.	80 per cent.
Sample 4.	0.5 per cent.	65 per cent.	80.5 per cent.
Sample 5.	5.07 per cent.	62 per cent.	70.3 per cent.
Ash 1 per cent.	E. H. Gane.		

Resorcin.

Varies in melting-point from 110.5° C. to 114° C. W. L. Scoville.

Saccharin.

Tests 425 to 550 times as sweet as sugar. W. L. Scoville.

Salophen.

Adulterated with 25 per cent. acetanilide. Zernik.

Sanguinarine Nitrate.

Only 52 per cent. pure. Contains potassium nitrate, sugar of milk and aniline dye.

L. H. Bernegau.

Resin of Scammony.

6 samples adulterated with starch. W. M. Quinlan.

Scammony.

A fictitious gum is in French commerce. Brownish cakes, less dense than the genuine, more porous fracture, less active. Pharmaceutical Journal.

Caustic Soda.

Runs quite uniform. 85 per cent. to 96.4 per cent. W. L. Scoville.

Sodium Carbonate.

Means several things in commerce. On U. S. P. basis from 34.4 per cent. to 97.2 per cent. of official. Water of crystallization is, of course, the chief feature in the lower percentages. W. L. Scoville.

Sodium Phosphate, Dried.

None of the dried sodium phosphate on the market is U. S. P. It contains 9 per cent. to 25 per cent. of moisture. H. A. Bradshaw.

Spermaceti.

The commercial does not comply strictly with official requirements, being usually lower both in sp. gr. and melting-point. This is not due to adulteration, but because all of the sperm oil has not been removed. For this reason the U. S. P. test for stearic acid often gives fallacious results. Sp. gr., 0.897; melting-point, 42° C.; saponification number, 142; iodine number, 7.57. Insoluble in 90 per cent. alcohol. E. H. Gane.

Solution of Chlorinated Potassa.

Some samples were free from chlorine. Others assayed 0.608, 0.62, 1.64, 2.06, 2.08, 1.5, 2.77, 2.86 per cent. J. G. Molineaux.

Solution of Chlorinated Soda.

Assayed 0.13, 0.359, 0.33, 0.615, 1.63, 1.66, 2.79, 2.83, 3.01, 3.05 per cent. J. G. Molineaux.

Spirit of Anise.

1.5, 4.4, 5.2, 2.5, 3.5, 3.8, 5.8, 5.9, 6.3, 6.3, 4.8 per cent. of oil anise, instead of 10 per cent. by volume called for. Mass. State Board of Health.

Spirit of Ether, Comp.

Of 25 samples only 1 had the required amount of ethereal oil. Some had none. R. A. Grimes.

Spirit of Nitrous Ether.

15 samples assayed from 1.97 per cent. to 3.71 per cent. None contained the 4 per cent. required. Only 2 were above 3.5 per cent. J. B. Sawtelle.

Spirit of Peppermint.

7.1, 6.8, 6, 6.11, 6.95 per cent., instead of 10 per cent. by volume required. Mass. State Board of Health.

Stramonium.

Not one sample was up to the original 0.35 per cent. All met 0.25 per cent. A. H. Clark.

Has been found considerably adulterated with chopped chestnut leaves, and large shipments have been rejected for this reason. If stramonium leaves are pure and good they will assay 0.35 per cent., and 0.3 per cent. should be insisted on. H. H. Rusby.

6 samples assayed 0.41, 0.37, 0.29, 0.34, 0.31, 0.35 per cent. E. L. Patch.

Strophanthus.

A paper will be presented at the Scientific Section to show that *strophanthus hispidus* is a stronger and better drug than *strophanthus kombe*. This claim seems to be inconsistent with the standard on which it is based, and shows to the great need of more attention from physiologists and therapists as to what our standard should be. Our Revision Committee has signally failed in defining the properties on which standards should be based. It has done much work on chemical properties, much of which is valueless because the materials employed are not fully authenticated. H. H. Rusby.

Suppositories of Lead Acetate, 3 grains each.

10 lots of 12 each were assayed, and were found varying in acetate of lead contents from 0.058 grain to 6.77 grains. L. F. McBride.

Tragacanth.

Is adulterated with dried starch paste. Aph. Zeitung.

Vanilla Extract.

Of 81 samples 30 were below standard. 18 were illegally labeled. Conn. Agri. Exper. Station.

For the Committee,

EDGAR L. PATCH,
L. F. KEBLER,
WILBUR L. SCOVILLE,
H. H. RUSBY.

May 2, 1910.

Mr. Kebler presented in abstract a supplemental report to that of the Committee on Drug Market, embodying the results of investigations by the Government along the line of adulteration and misbranding of drugs.*

Mr. Hallberg asked Mr. Kebler whether he had found drugs and chemicals professing to be U. S. P. adulterated, or below standard; and if so, whether there was a statement to that effect on the label.

Mr. Kebler replied that this was true in a few instances. He said the importers frequently labeled a product as being deficient, but in that case there was a proviso in the law which made it possible to exclude it, if it was deleterious to the public health. As a rule, he said, there was no declaration on the label. Strenuous efforts were being constantly made to import products and then label them at the port of entry to comply with the Pharmacopœia; and then, after these products got into the country, nobody knew what became of them.

Mr. Rusby also spoke of the constant attempts being made by the dealers and importers engaged in interstate commerce to change the labels slightly, so that the name of the drug would be one not found in the Pharmacopœia, and then claim they were not liable. He gave examples of such attempts in ground male-fern and colocynth. Mr. Rusby said it was the same old story, and if anybody thought that adulteration of imported drugs was a dead letter, he was very much mistaken. He said this practice was not confined to one locality, and the only way to put an effectual stop to it was for the States to join hands with the Federal Government and make a determined effort to stop it. It was useless, for instance, for the Department of Agriculture to establish standards that were ignored in the States. Unless such articles were found in the Pharmacopœia or in some other book recognized by the State authorities, he did not see how these practices could be stopped. He thought that no one method would suffice, but that all the methods that could be thought of would have to be used.

* This report has unfortunately disappeared; all efforts to locate it have proven unsuccessful and a duplicate could not be obtained.—THE GENERAL SECRETARY.

Mr. Wetterstroem, of Cincinnati, wanted to know about the Dispensatories as a standard, but Mr. Kebler explained that only the U. S. Pharmacopœia and National Formulary were recognized as standards under the Federal Law.

Mr. C. Caspari, Jr., asked what standard would be assumed for an article not official in the Pharmacopœia at all, and found to be adulterated with mineral matter. Mr. Rusby replied that his instructions were to examine products that came in powdered form, to see whether they were truthfully named, and fit in quality for use in making medicinal preparations; and that in a case of that kind he would recommend to his superior that such articles be rejected, because not of fit quality for medicinal use. Then the importer would make a protest.

Mr. Caspari said, Take the case of kamala, a drug not recognized in the U. S. Pharmacopœia, but recognized in the German Pharmacopœia, the latter giving the standard of ash as not exceeding five per cent., while the product came into the country with 10 or 15, or even 25 per cent. of ash; in other words, grossly adulterated. He wanted to know if the party in this case would be liable to prosecution. Mr. Rusby responded that if it was interstate commerce goods, he would declare it was not truthfully named. He suggested that Mr. Kebler could probably throw some light on this proposition.

Mr. Kebler stated that in a great many cases the Government did take the common standard for its guide. Where an article was not official in the present Pharmacopœia, but was in the Pharmacopœia of 1890, the latter would be taken as the standard. While the question had never been tested, he thought that where there was a description well recognized by the trade, the court would sustain such a standard. He took the case of chestnut leaves as an illustration. On the other side of the proposition he took Hoffman's Anodyne as an illustration, a name applied indiscriminately to at least three different products: in Germany one would get one thing, while in this country, under the Pharmacopœial name, he would get quite another. Then if he bought it under the name of the commercial article, he would get a mixture of ether, alcohol and water in equal parts. He could hardly see how a fixed standard could be provided in a case of this sort.

Mr. LaWall said that in Philadelphia, where the importers and wholesalers worked in harmony with those who examined drugs, when an adulteration was reported, they simply refused to accept it. If the importers insisted on admission, it might become a question as to how to enforce the standard. Up to the present, they had no difficulty at all. He used an importation of adulterated quince seed, which they had re-shipped without trouble, as an example.

Mr. Kebler thought Mr. LaWall had brought up an entirely different subject from that presented by Mr. Caspari, and said if the quince seed

was to be used in interstate commerce his position would be perfectly correct. It was a fact that a cabinet officer had absolute jurisdiction under the Federal Law as to whether or not a product should come into this country, and if the Secretary of Agriculture said that a product was a violation of the law, there was no appeal from his decision.

The Chair stated if there was no further discussion the report would be accepted, and the Section would pass on to the next business, which was a paper by Henry Kraemer, upon the subject of "A New and General Adulterant of Roots and Drugs." The reading of this paper, however, was passed for the time being, on account of the absence of the writer.

The Chair stated that the next paper was one by Albert Schneider, of San Francisco, upon "The Necessity for Drug Reform." He said the paper was a long one and the author was not present. He called for action thereon.

Mr. Hallberg moved to receive and refer by title, and the motion prevailed.

Mr. LaWall presented the following paper upon "Ash Standards for Vegetable Drugs."

ASH STANDARDS IN DRUGS—ARE THEY NECESSARY?

BY CHARLES H. LAWALL AND HENRY A. BRADSHAW.

In 1897* one of the authors of this paper (LaWall) published an article giving data upon a number of commercial specimens of drugs as regards ash, moisture, and in some cases active principles. Attention was called to the fact at that time that the ash of drugs is a fairly constant factor, which, while probably of little direct bearing upon the physiological activity, nevertheless indicates, especially in root drugs, freedom from excessive amounts of inert earthy material due to careless methods of collecting and drying, and the fairly constant ratio which is found in a given drug may be taken as a criterion in part of its freedom from other materials which might be mixed with it and in which the ash ratio differs appreciably. When it is seen that chestnut leaves contain only in the neighborhood of 4 per cent. of ash, while the solanaceous leaves, such as belladonna, hyoscyamus and stramonium, contain from 13 per cent. to 30 per cent., the value of the ash factor as confirmatory evidence of admixture is realized.

No attempt was made in the present work to estimate moisture and calculate results to the dry basis, as was done in the paper referred to, as it was found at that time that the difference never amounted to more than 10 per cent. of the weight of the ash and was more than counterbalanced by the slight variations in different samples of the same drug. The following list, therefore, represents the commercial drug in the air-dried form,

* A. J. P., Vol. 69, p. 137.

and mainly comprises routine samples of drugs which have been imported in the whole state and of which a representative sample of authentic drug was taken for the determination. The arrangement has been made alphabetical, italicizing those titles of drugs which are official. In some instances it will be noted that a number of samples of one drug have been examined, while in many others but one or two figures are given. This is due to the relative frequency or infrequency with which the drugs are imported at Philadelphia, and the results are submitted to be taken in conjunction with the previously published work upon this subject. This work, together with any results which may be presented later, will serve as a guide to those who are entrusted with the task of fixing standards for the next U. S. Pharmacopœia, as the authors believe that an average ash standard appended to each drug described would be of advantage and value in fixing its identity.

LIST OF DRUGS WITH ASH DETERMINATIONS.

	<i>Percentage of Ash.</i>
<i>Absinthium</i> ,	13.45, 8.8, 12.27.
<i>Acacia</i> ,	2.85.
<i>Aconite Root</i> ,	4.7, 3.4.
<i>Almond Meal</i> ,	3.75.
<i>Aloes Socotrine</i> ,	0.1.
<i>Aloin</i> ,	0.7.
<i>Althca Root</i> ,	5.49.
<i>Angelica root</i> ,	5.15.
<i>Anise Seed (Pimpinella A.)</i>	8.5, 5.9, 9.9, 5.35, 9.8, 5.7,
<i>Anthemis</i> ,	4.8, 5.87, 4.7.
<i>Apocynum Cannabinum</i> ,	3.4.
<i>Areca Nut</i> .	1.7.
<i>Arnica Flowers</i> ,	8.7, 6.55, 7.0, 7.7.
<i>Arnica Root</i> ,	9.07.
<i>Asafetida</i> ,	22.9.
<i>Basil Leaves</i> ,	15.4, 13.5.
<i>Belladonna Leaves</i> ,	11.0, 13.5, 15.2.
<i>Bittersweet Twigs</i> ,	4.3.
<i>Black Hellebore Root</i> ,	6.6.
<i>Blessed Thistle Herb</i> ,	18.36.
<i>Bryonia Root</i> ,	2.8.
<i>Buchu Leaves, long</i> ,	5.55.
" " <i>short</i> ,	5.5, 4.5, 4.2, 4.3.
<i>Buckthorn Berries</i> ,	2.6, 2.6.
<i>Buckthorn Bark</i> ,	4.2, 3.2, 5.2.
<i>Burdock Root</i> ,	7.15, 4.67, 5.4, 12.6.
<i>Calabar Bean</i> ,	2.8.
<i>Calamus</i> ,	3.9, 2.4, 4.2.
<i>Calendula</i> ,	7.6, 8.5, 8.35, 7.2.
<i>Calumba</i> ,	6.95, 10.4.
<i>Cannabis Indica</i> ,	24.0, 18.04, 14.8, 9.6.

<i>Cantharides,</i>	6.53, 5.70.
<i>Capsicum,</i>	4.4, 4.9, 4.6, 5.7, 4.9, 5.75, 5.1, 5.3.
<i>Caraway Seed,</i>	7.8.
<i>Cardamom Seed,</i>	7.9, 6.1, 6.9, 6.0, 3.7.
<i>Cascara Sagrada Bark,</i>	4.9.
<i>Cedron Seed,</i>	1.14.
<i>Celery Seed,</i>	7.2.
<i>Centaur Herb,</i>	3.0, 5.08.
<i>Chestnut Leaves,</i>	3.2, 4.4.
<i>Chimaphila,</i>	3.2.
<i>Chondrus.</i>	15.3.
<i>Cimicifuga,</i>	9.65.
<i>Cinnamon, Cassia,</i>	10.3.
" <i>Ceylon,</i>	3.4.
" <i>Saigon,</i>	2.44, 3.3, 3.4, 4.8, 3.2, 3.3, 3.1, 2.9, 2.4, 2.45.
<i>Cinchona, Red,</i>	6.5.
" <i>Yellow,</i>	2.4.
<i>Cloves,</i>	5.75, 5.9, 6.0, 5.3, 6.4, 5.25, 6.2, 5.3.
<i>Cocu,</i>	10.6.
<i>Cocculus Indicus,</i>	4.18, 4.67.
<i>Cochineal,</i>	3.28.
<i>Coffee, roasted,</i>	3.95, 3.5, 3.03, 3.75, 3.9, 4.0, 3.9, 4.05.
<i>Colchicum Corm,</i>	2.0, 2.5.
<i>Colchicum Seed,</i>	2.5, 3.5.
<i>Cotocynth,</i>	12.38.
<i>Coltsfoot Leaves,</i>	5.6, 8.3.
<i>Comfrey Root,</i>	6.5, 7.06.
<i>Condurango Bark,</i>	8.84, 6.7.
<i>Conium Leaves,</i>	14.6.
<i>Conium Seed,</i>	6.85.
<i>Convallaria Root,</i>	9.26.
<i>Coriander Seed,</i>	8.1, 6.2, 4.55, 7.18, 8.10, 7.7.
<i>Cotton Root Bark,</i>	4.3, 6.1.
<i>Crocus Stigmatis,</i>	4.1.
<i>Cubeb Berries,</i>	5.7, 6.1.
<i>Cusso Flowers,</i>	20.7.
<i>Digitalis Leaves,</i>	8.4, 8.9, 8.31, 6.75, 8.15.
<i>Elm Bark,</i>	9.7.
<i>Ergot of Rye,</i>	2.55, 2.46, 2.7.
<i>Eucalyptus Leaves,</i>	6.3.
<i>Euonymus Bark,</i>	11.1.
<i>Eupatorium Herb,</i>	7.5.
<i>Euphorbia Pilulifera,</i>	3.0.
<i>Fennel Seed,</i>	8.6, 7.08, 6.83, 7.7, 11.8.
<i>Feverfew Herb,</i>	5.6.
• <i>Foenugreek,</i>	3.07.
<i>Gelsemium Root,</i>	1.4.
<i>Genista Herb,</i>	2.4.

<i>Gentian Root,</i>	3.7, 2.3, 2.4.
<i>Geranium,</i>	6.4.
<i>Ginger, African,</i>	4.2, 4.9, 4.5, 4.9, 4.3, 5.5, 5.1, 5.4, 5.4, 3.5, 3.5, 2.5.
<i>Ginger, Jamaica,</i>	3.7.5.
<i>Grains of Paradise,</i>	2.0.
<i>Granatum,</i>	14.6, 17.4.
<i>Grindelia Robusta,</i>	6.3.
<i>Haematoxylon,</i>	4.1.
<i>Hedeoma Herb,</i>	16.9.
<i>Henna Leaves,</i>	8.76.
<i>Hepatica Leaves,</i>	9.3.
<i>Horse Nettle Herb,</i>	6.3.
<i>Hydrastis,</i>	9.15.
<i>Hyssop,</i>	15.2.
<i>Ipecac,</i>	2.7, 3.0.
<i>Jaborandi,</i>	4.8.
<i>Jalap,</i>	4.2.
<i>Juniper Berries,</i>	2.8, 2.3.
<i>Kava-Kava,</i>	5.2.
<i>Kino,</i>	5.9.
<i>Krameria,</i>	2.55.
<i>Lactucarium,</i>	5.72.
<i>Larkspur Seed,</i>	5.45, 4.5, 5.4.
<i>Lavender Flowers,</i>	6.6.
<i>Leptandra,</i>	9.1.
<i>Licorice, Russian,</i>	4.75.
<i>Licorice, Spanish,</i>	3.85.
<i>Linden Flowers,</i>	4.8.
<i>Lobelia Herb,</i>	14.5, 8.8.
<i>Lycopodium,</i>	2.45, 1.74, 1.3, 1.4.
<i>Mace,</i>	2.1, 1.89, 2.55, 4.7, 2.4, 3.45, 2.6, 2.8, 1.6, 2.0.
<i>Male Fern,</i>	2.57.
<i>Mallow Flowers,</i>	9.44.
<i>Manna,</i>	1.06, 6.50.
<i>Marjoram Leaves,</i>	11.6, 11.75, 12.2, 12.5.
<i>Marrubium,</i>	22.8.
<i>Matico,</i>	16.8, 16.1.
<i>Matricaria,</i>	9.65, 11.68.
<i>Mezereum,</i>	3.8.
<i>Mullein,</i>	24.9.
<i>Mustard, Black,</i>	5.45, 5.3, 7.5.
<i>Mustard, Yellow,</i>	4.9, 5.0, 5.2, 3.6, 4.4, 4.7.
<i>Myrrh,</i>	3.02.
<i>Nettle Herb,</i>	16.0.
<i>Nutmegs,</i>	1.5, 2.0, 2.5.
<i>Nux Vomica,</i>	10., 1.4, 0.9, 1.6.

<i>Orange Peel, Bitter,</i>	3.1.
<i>Orange Peel, Sweet,</i>	3.75, 3.35.
<i>Pansy Herb,</i>	8.7.
<i>Paprika,</i>	5.05, 5.0, 5.1, 7.4, 7.7, 7.5, 6.8, 8.2, 7.4, 6.7, 6.5.
<i>Pareira Brava,</i>	2.9.
<i>Parsley Seed,</i>	6.61, 9.1.
<i>Passion Flower,</i>	23.15.
<i>Pepper, Black,</i>	5.6, 5.6, 5.10, 5.3, 5.6, 4.8, 5.5, 7.3, 5.3, 5.1, 5.1, 5.3.
<i>Peppermint,</i>	10.1, 11.15.
<i>Pimenta,</i>	3.3, 3.6, 3.9, 3.6, 3.8, 4.2, 4.25.
<i>Podophyllum,</i>	3.6.
<i>Poke Root,</i>	14.0, 8.3.
<i>Pulsatilla Herb,</i>	9.95, 7.4.
<i>Pyrethrum Root,</i>	6.1.
<i>Quassia,</i>	2.4.
<i>Quercus Alba,</i>	6.8.
<i>Quillaya,</i>	9.5, 9.1.
<i>Quince Seed,</i>	3.6, 3.9.
<i>Rhubarb,</i>	8.2.
<i>Rose Leaves, Red,</i>	3.9.
<i>Rosemary Herb,</i>	5.1.
<i>Rubus,</i>	7.1.
<i>Rumex,</i>	6.1.
<i>Sabadilla Seed,</i>	4.45.
<i>Salvia,</i>	3.8, 8.0, 7.4, 7.75.
<i>Sanguinaria,</i>	4.55.
<i>Sassafras Bark,</i>	4.15.
<i>Savory Herb,</i>	12.5, 11.9.
<i>Scopola Root,</i>	6.65.
<i>Senega Root,</i>	5.05.
<i>Senna, Alexandrian,</i>	8.9, 7.5.
<i>Spearmint Herb,</i>	9.7.
<i>Squill,</i>	2.7.
<i>Stramonium Leaves,</i>	18.9, 19.0, 18.55.
<i>Strophanthus Seed,</i>	6.6.
<i>Tansy herb,</i>	9.25.
<i>Thyme Herb,</i>	7.4, 8.2, 9.1, 10.2.
<i>Tragacanth,</i>	2.45, 2.7.
<i>Triticum,</i>	3.0, 3.65.
<i>Turmeric,</i>	9.2, 6.0, 6.5, 8.6, 7.0, 6.5.
<i>Valerian Root,</i>	20.15.
<i>Veratrum Viride,</i>	14.95.
<i>Viburnum Opulus,</i>	3.35.
<i>Viburnum Prunifolium,</i>	7.30.
<i>White Agaric,</i>	1.5.
<i>Wild Cherry Bark,</i>	3.4.

<i>Witch Hazel Leaves,</i>	5.55.
<i>Woodruff Herb,</i>	11.22.
<i>Wormseed, American,</i>	7.0.
<i>" Levant,</i>	6.0, 4.32, 9.7.
<i>Xanthoxylum,</i>	5.0.

Mr. A. R. L. Dohme, asked the author if there was anything like uniformity in the samples, and Mr. LaWall replied that there was a great deal of uniformity; that the range was very slight in any one given drug, by the figures as shown in actual practice, while other drugs showed a very different proportion of ash.

Mr. Rusby suggested another valuable use for ash determination. He said it was sometimes difficult to tell what quantity of stem a drug contained; it might be known there was too much woody tissue in the ground drug, but it was difficult to tell how much, and in such cases the ash determination would sometimes enable one to do that.

Mr. Stanislaus said he had found on examination of vegetable drugs that very often there was mineral matter adhering to them to a considerable extent. He knew of instances where upwards of eight per cent. had been found in the ash. Mr. LaWall responded, that, as stated in the paper, these were simply commercial drugs as they entered the market, and were such specimens as would pass current without criticism as to their appearance.

Mr. Rusby said that henbane was apt to lie on the ground in sandy soil, and the dirt would get into the leaves, and it was very difficult to wash it out sometimes without breaking them. He related some of his experiences in dealing with importations of this drug.

Mr. Kebler said he considered ash determination in their work in the Government laboratories as of great value. He said they were now experimenting in other directions, also. He instanced the case of colocynth, where, by the ash determination, the chemist could say whether or not seeds are present. If a considerable quantity of seed was found, the ash was proportionately low. From the experience they have had, he thought it very desirable to include in the Pharmacopœia a maximum ash limit. He favors to meet such conditions as Mr. Stanislaus referred to, where a considerable amount of earthly material often adheres to the plant. The leaves of digitalis, henbane and the like are usually contaminated with a considerable amount of inorganic matter, but he thought that some maximum limit should be fixed.

Mr. C. E. Caspari said that the determination of the alkalinity of ash had been very important in the detection of spurious extract of vanilla; that it was the practice in certain localities to make an extract of vanilla by dissolving vanillin in alcohol, and then using a certain amount of alkali to dissolve certain resinous matter from exhausted beans, calling that ex-

tract of vanilla ; about the only way it could be detected would be to determine the alkalinity of the ash.

The Chair stated that the paper would go to the Publication Committee, without objection, and it was so ordered.

The Chair stated that the next thing for consideration was two papers on nomenclature, the first by Oscar Oldberg, which was in print, and of which the author had sent an extended abstract, with the request that it be read. He said that, without objection, the abstract would be read, instead of the paper. Mr. Richtmann, Associate on the Committee, then read the abstract referred to, the full text of the paper being as follows :

THE SO-CALLED "LATIN TITLES" FOUND IN THE PHARMACOPŒIAS.

BY OSCAR OLDBERG.

The Pharmacopœia of the United States, Ninth Edition (Eighth Revision) p. lxii, calls the technical names of its drugs, chemicals and preparations the "Latin Titles." It is an almost universal custom to call them "Latin names," even in text-books and reference works of pharmacy and materia medica which fail to explain that very few of these technical titles are really unaltered Latin words, that less than one-third of them contain a syllable derived from any Latin word, and that while a Latin appearance has been imparted to most of them by arbitrarily giving them terminations such as Latin words commonly have, many other pharmacopœial titles do not even have Latin endings.

Technical terminology is absolutely necessary to every branch of science. The mastery of materia medica, chemistry and pharmacy would be impossible without the concurrent mastery of their special technical terms. Such terms must each have a fixed and unambiguous significance, and the enormous number required of these could never be supplied without coining entirely new words whose meaning is then specifically defined. These new terms are fashioned out of materials furnished by words from many different languages, from the names of men and places, and from other sources. Many technical names are formed out of parts of two or more words from one or more languages, dead or living. A few are old names which have ceased to have their original meaning.

The really Latin words employed unaltered in pharmacopœial nomenclature are less than one hundred, and most of these are adjectives. Latin names of individual substances contained in the pharmacopœias are so extremely rare because botany, chemistry and pharmacy were unknown to the people who made the Latin language.

LESS THAN FIVE PER CENT. OF THE WHOLE NUMBER OF NOUNS USED AS PHARMACOPŒIAL TECHNICAL TITLES ARE TRUE LATIN NAMES.

Immediately upon the publication of the seventh edition ("Sixth Revision") of the Pharmacopœia of the United States I grouped the 457 words employed in making up its 997 titles according to their derivation.

Of these 457 words 372 are nouns and 85 adjectives. I counted carbo, carboneum, carbonas, bicarbonas and subcarbonas as five of the 457 words and as of Latin origin; and the words chlorum, chloras, chloridum, and chloratus were counted as four words of Greek origin.

Of the 372 nouns used as titles of distinct substances I found 147 described as of Greek and 108 as of Latin derivation, leaving 117 derived from all other sources, so that considerably less than one-third, including the unaltered Latin names, are of Latin origin, and most of these 108 titles contain but one or two syllables taken from Latin words.

Of the entire 457 words (nouns and adjectives) out of which the 997 titles of that pharmacopœia are composed :

171 are described as of Greek origin.

153 are said to be of Latin origin.

21 are reported as of mixed Latin and Greek derivation.

20 are derived from Arabic words.

45 are derived from words of other languages.

29 from names of countries and places.

18 from names of persons.

But all of these titles are called "Latin names," and the statement is often made that in order to understand them well it is necessary to know Latin. Another statement frequently made is that the Latin names of the drugs, chemical compounds and pharmaceutical preparations are used because "Latin being the language of science" those names are understood in all countries. These statements are singularly out of harmony with the purpose of technical terminology which is the highest degree of accuracy.

Latin scholars understand the true Latin words, such as aqua, ferrum, lac, mel, and the few other really Latin titles to be found in pharmaceutical nomenclature, and they will as unerringly know that the terms jaborandi, kamala, looch, catechu, gambir, kermes, cusso, buchu, carageen, quebracho, and a considerable number of other titles given in now living pharmacopœias, can not be Latin.

Latin scholars would fail to recognize the "Latin names" potassium (from the English words *pot* and *ashes*), belladonna (composed of the Spanish words *bella*, beautiful, and *donna*, lady), manganum (said to be, together with the title magnesium, derived from the name of the town of Magnesia in Asia Minor), and grindelia (named after Mr. Grindel).

As for the technical titles containing one or more syllables taken from Latin words, it must be admitted that the most intimate knowledge of Latin would throw little if any light upon their significance, as may be seen from the names cimicifuga (from *cimex*, bug, and *fugare*, to drive away), cornus (from *cornu*, horn), frangula (from *frangere*, to break), illicium (from *illicere*, to allure), pulsatilla (from *pulsatilis* throbbing), serpentaria (from *serpens*, snake), ustilago (from *urere* to burn), valeriana (from the name *Valerius*, or its origin *valere*, to be strong.)

A Latin scholar knows the general meaning of the word "extractum," but he would know little or nothing of the pharmaceutical meaning of the title extractum, or of trituration, spiritus, suppositorium or emulum.

Evidently the statement that the official technical titles of drugs, chemicals and preparations are their "Latin names" is 95 per cent. untrue. A semblance to Latin has been arbitrarily imparted to most of these titles by giving their nominatives Latin-looking endings and forming their genitives according to the five Latin declensions. This universal custom has given rise to the false notion that they are Latin names, whereas they are at most latinized, or rendered latinic in appearance, whenever found practicable and deemed necessary or desirable. This artificial latinization of the pharmacopœial nomenclature has been in use for generations and has been found of great practical utility in most instances.

But laymen who do not understand the necessity of scientific technical terminology have often accused the medical profession of writing prescriptions in Latin for the purpose of keeping patients in ignorance of the kind of medicine prescribed. These would-be reformers do not and can not know that technical terms, whether Latin or not, are unavoidably unintelligible to all persons except the trained specialists who use them, and that it is in reality the technical terminology and not Latin that they object to. What they demand is prescriptions which they can understand, not knowing that such a thing if possible would be dangerous. They complain that "Latin prescriptions" are written in order to conceal the character of the medicines, not knowing that ample and precise information concerning their ingredients under the names by which they are prescribed and dispensed, is freely accessible to all men in the Pharmacopœia and other technical works, but that this like all other scientific information can be given only in language which laymen can not understand. They ignorantly propose to destroy or impair an efficient means of protection to the public which has been painstakingly built up and improved through generations by the physicians and pharmacists, the specialists who alone are able to perform that duty, and whose sole object was and is the prevention of errors and abuses. When a layman into whose temporary possession a prescription may fall can read it, or thinks he can do so, he sometimes abuses it by advising friends and neighbors, who, in his opinion, have the same trouble as the patient for whom the prescription was written, to use the same medicine. Deplorable results have not infrequently followed.

Crudities still exist in the technical nomenclature of most pharmacopœias, but corrections are being made to bring the style of the titles into harmony with scientific progress and with recognized linguistic rules and sense of fitness, as well as to make them more accurate and convenient to those who are to use them.

In all that we do toward perfecting our technical pharmaceutical titles

we ought to bear in mind that ultimate international uniformity is highly desirable, and that it is by no means unattainable. Conflict with scientific truth ought not to be permitted, but very recent pharmacopœias still continue to call some oxides acids, and to use the old title "hyposulphis" while translating it thiosulphate.

Such a crude title as "æther petrolei" should no longer be employed for a hydrocarbon, and Hg_2Cl should not be called "hydrargyrum chloratum" while HgCl is called "bichloratum," these latter titles having reference to the old and discarded molecular formulas.

Errors of this sort were corrected in the Pharmacopœia of the United States when last revised.

Changes are easily made, because the technical terms we use are to a very great extent coined words of our own making. We should thankfully accept suggestions from botanists, chemists and philologists as far as we can do so without sacrificing practical advantages of greater value to us than strict conformity to the opinions of other specialists who are not sufficiently familiar with the peculiar requirements of pharmacy.

That minor modifications are easily made is shown by the fact that within the brief space of forty years we have had such a variety of names, form and spelling in different pharmacopœias as seen in the following examples; the element arsenic has been called arsenum, arsenium and arsenicum; antimony has been called stibium, antimonium, and antimonum; we have had the names kalium and potassium, natrium and sodium, aluminium and aluminum, manganese and manganum, iodinium and iodum; chloral and chloralum, amyl and amylium, gelatina and gelatinum, cresol and kresolum, chloroformum and chloroformium, menthol and mentholum, iodol and iodolum, etc.

A pharmaceutical nomenclature constructed without due regard for the requirements of the writers of prescriptions can not be the best. They want titles as brief and as easily written as possible, and when long titles seem unavoidable they should be made to be as easily abbreviated as may be possible without loss of clearness and without violating grammar and good form. Such titles as hexamethylenamina, methylthioninæ hydrochloridum, and sulphonethylmethanum are abominations.

Shall we continue this absurd style of titles until we reach such names, already official in recent pharmacopœias, as: "diethylmalonylcarbamidum," "acetylparaminophenolum salicylicum," "trimethylbenzoxypiperidinum hydrochloricum," and "diethylsulphonmethylæthylmethanum"? The Latin in these names consists of the terminal *um*.

I am unable to find sufficient or consistent reasons for the titles "hydrochloride" and "hydrobromide" applied to the salts formed by the alkaloïds with hydrochloric and hydrobromic acids. The fact that the hydrogen atom of the acid enters into the compound formed need not be indicated by the official title of the compound, and we do not, and cannot

name the alkaloidal salts formed with other acids in that manner; we do not say hydrosulphate, hydrophosphate or hydrosalicylate of quinine, etc. Instead of burdening writers of prescriptions with such a long title as "*cocainæ hydrochloridum*" it seems to me that *cocaina chloridum* is much to be preferred; it is shorter, it cannot be misunderstood and it corresponds with the titles of the salts formed by ammonia with the acids.

It is unnecessary here to mention all cases of needlessly long titles, but there are several more. One of the long adjectives used is "*exsiccatus*", which should be shortened to *siccatus*, or even to *siccus*. Every useless letter should be eliminated, but we have actually lengthened several brief titles without gaining anything thereby. Nothing was gained by changing chloral to chloralum, or amyl nitris to amylis nitris, and the genitives æthyl, methyl, amyl, phenyl, glyceryl, alcohol, guaicol, menthol, phenol, and thymol are more convenient than æthylis, mentholis, alcoholis, etc. Chemists continue to coin such names as fast as needed. Shall we cease them and tack on caudal appendages which are wholly superfluous? Not one of them is Latin either before or after. The rule we formerly followed in the American Pharmacopœia under which technical titles ending in -al, -ol, or -yl were treated as indeclinable words was one of practical value and should be restored. Every title which can without impropriety be treated as indeclinable should be so treated. This title had the unqualified approval of no less an authority than Charles Rice. It was a mistake to give coca the genitive cocæ without reason.

Among the useful changes of official "Latin names" made in the last Revision was the shortening of valerianate to valerate. Among the changes which should *not* have been made is the substitution of the philologically awkward title fluidextractum, which can not with propriety be sufficiently abbreviated as can the title extractum fluidum which prescription writers can abbreviate to extr. fl. The suggested abbreviation "fl. extr." is not an abbreviation of fluidextractum, but of fluidum extractum.

The endings -ina for the latinic names of alkaloids and -inum for "neutral principles" should stand, together with the terminations -ine and -in for the English names, because they have a recognized practical value to both chemists and pharmacists.

It would not be surprising should physicians decide that the titles of pharmaceutical preparations of plant drugs would be more convenient if inverted so that when arranged in alphabetical order all the different preparations of the same drug fall together in a group. The grouping of all tinctures in one place, extracts in another, and so on, is of minor value to the pharmacist and of no value to the physician, but the grouping of all opium preparations under opium, aconite preparations in the same place where aconitum is, etc., would be useful to both professions. It would be seen, at a glance, what preparations of opium the Pharmacopœia contains from which the physician may choose; and methods of

preparation, menstrua, doses, and other points of difference could be at once compared. Digitalis, digitalis extractum, digitalis extractum fluidum, digitalis infusum and digitalis tinctura should be found together, and if digitoxinum is introduced in the Pharmacopœia it should be placed with the other forms of the therapeutic agent digitalis.

The inorganic chemical compounds have technical latinic titles constructed according to three entirely different methods—the Berzelian, the German and the English. Silver oxide is called "argentum oxydatum" in countries where the German method is employed, it is called "argenti oxidum" in the United States and Great Britain, and if it were included in the Swedish Pharmacopœia it would there be called "oxidum argenticum." Silver nitrate is called "argenti nitras" in the United States, "argentum nitricum" in Germany, and "nitras argenticus" in the Scandinavian countries, France and Russia.

It has recently been suggested in our country that in order to make due distinction between ferrous and ferric and between mercurous and mercuric compounds, some such titles as "ferro sulphas" and "ferri sulphas," "hydragyro chloridum," etc., might be used. It is to be hoped that titles of such extraordinary construction will never be adopted.

Whenever changes are made in pharmacopœial nomenclature we must bear in mind that ultimate international uniformity ought to be promoted. Modern chemical nomenclature in English, German and all other living languages is to a great extent already similar. We say ferrous and ferric chloride, mercurous and mercuric iodide, argentic nitrate, arsenous oxide, etc. The Berzelian system of latinic titles for inorganic chemical compounds is in harmony with this modern chemical nomenclature, and should be preferred to the other systems. It is natural and easily applied.

It is extremely unfortunate that we have the two names kalium and potassium for K, the two names natrium and sodium for Na, and stibium and antimonum for Sb. The names potassium, sodium and antimonum will never replace the names kalium, natrium and stibium, but the names corresponding to the chemical symbols will prevail. In striving to bring about ultimate world-wide uniformity we must not lose sight of the rule of the survival of the fittest."

We have already made a beginning in the recognition of modern chemical nomenclature in the English technical titles of the American Pharmacopœia by adopting the terms ferrous and ferric, mercurous and mercuric, arsenous (iodide), etc. We might with great advantage extend this general method to the latinic titles in all cases where specially applicable. Ferrous sulphate should be called *ferrosus sulphas*, ferric chloride would be called *ferricum chloridum*, mercurous chloride would have the latinic title *hydrargyrosus chloridum mite*, arsenous oxide should be called *arsenosum oxidum*, arsenous iodide would become *arsenosum iodidum*, and we should construct similar latinic titles in all analogous cases.

These titles are as natural and permissible as those of *acidum sulphuricum* and *acidum sulphurosum*.

Northwestern University.

The Chair then called for a paper by Mr. Hallberg, on "Nomenclature of the U. S. Pharmacopœia," and Mr. Hallberg presented his subject as follows :

THE NOMENCLATURE OF THE U. S. PHARMACOPŒIA.

BY C. S. N. HALLBERG.

The origin and evolution of the nomenclature of an art or science is necessarily similar to that of a general language, since it is language applied to some special subject or art.

A nomenclature should have these attributes in order of their importance: 1. Descriptiveness. 2. Definiteness. 3. Flexibility. 4. Brevity. 5. Euphony.

The whole tendency of nomenclatures has been in this direction, as it must continue, best to serve their purpose.

Imagine what we have escaped from in the following respective examples :

Cranium humanum decapitatum,

Vel signe ignei preparatum.

Liquor Fuliginis splendentis alkalinius.

From complexity to simplicity is the slogan, and singularly enough in this respect the older the country the more radical; the younger the more conservative.

In Latin countries the languages have undergone the greatest changes.

Spain and Italy write "*Farmacopea*." The present German written in Austria is scarcely recognized as the "original" German and is more advanced than that of the more modern German Empire. The English language is the most conservative of all, although it has undergone great changes since Shakespeare's time.

The Continental countries have an advantage inherent to their political status as distinguished from English-speaking countries, in that the governments, through their royal academies, etc., revise the languages at regular periods and the changes are accepted "*nolens volens*."

Contrast this simple process of "*fiat*" with the ludicrous attempt recently in this country at correcting the etymological monstrosities of some of the simplest English words, synthetized from a mixture compositum of Roman, Norman, Teuton, Scandinavian, Celt and Welsh, the conglomeration called English.

Even the strenuous former executive met his Waterloo—swift and sure—when he tampered with the sacred linguistic prerogatives of the Government Printing Office.

He may successfully traverse the Dark Continent and with trophies of untold victories attached to his belt of the ferocious beasts of the Jungle.

He may be received as the conquering hero by the crowned heads of Europe.

He may enjoy the plaudits of the universe as the apotheosis of the virility of the twentieth century, but lest he lay his vandal hands on the dear old English language—Beware !

THE FIRST PHARMACOPOŒIAS.

The present U. S. Pharmacopœial nomenclature is practically that of the first Pharmacopœia of the U. S. of 1820 ; the only changes being in the chemical and botanical parts. The pharmaceutical portion is scarcely changed at all, except for additions of some new classes of preparations, such as fluidextracts.

The Pharmacopœia of William Brown, M. D., of Lititz, Pa., 1778, contained 100 articles, divided into two classes :

(1) *Medicamenta interna*, with 84.

(2) *Medicamenta externa seu chirurgica*, with 16.

It contained twenty-five classes of preparations, fourteen of which are still official, so that only twenty new classes of preparations have been added, since this first attempt at a collection of the administrative forms of medicines.

The Pharmacopœia of Surgeon General Tilton of the Continental Armies, 1777, was somewhat similar.

The Pharmacopœia of the Massachusetts Medical Society 1808, endeavored to follow the Edinburgh Pharmacopœia, but in the translation from the Latin some changes were effected.

UNITED STATES PHARMACOPŒIA 1820.

The U. S. P. of 1820 in the Preface states : " In the formation of the American Pharmacopœia, the General Convention and their publishing committee have had to encounter those difficulties which must always attend the first publication of works of this kind." " The Selection of a *Materia Medica* ; the formation or adoption of preparations, and compounds, and the establishment of a *pharmaceutical nomenclature*, have constituted their chief labor." " On each of these departments of the work they have endeavored to bestow that degree of careful inquiry and mature deliberation which the importance of the occasion demanded ; and have pursued the course, which appeared to them best suited to supply the wants, and promote the interests of the medical community in all sections of the country."

Relative to the scope of articles contained it states : " The system of retrenchment might no doubt have been more vigorously exercised without ultimate disadvantage to the interests of medicine." " But it was thought

to be at present more conducive to the public good, to retain on the list all those medicines which were believed, to be so much in use in any part of the United States, that their omission would occasion inconvenience to physicians and apothecaries, and render the book less applicable to their wants."

On the Nomenclature it expresses itself as follows: "It has been endeavored that the nomenclature adopted in this work should be conformable to the present language of science, divested of as much of its prolixity as can be done consistently with clearness and distinctness. It is conceded that the essential properties of names ought to be expressiveness, brevity, and dissimilarity. Where these qualities can be preserved without too great a departure from language previously in use, they afford the best grounds of a convenient and intelligible nomenclature."

The binominal botanical nomenclature of the London and Edinburgh Pharmacopœias was substituted by the single title, usually the generic name of the plant, instead of the systematic name and usually with the name of the particular plant-part used added.

The chemical nomenclature of the London Pharmacopœia in which the base precedes in the compounds, was adopted and is retained to this day, as it is in the British and the German and several others, while in the French and Scandinavian Pharmacopœias the acid radical precedes in names for compound.

This is probably due to the use of French titles instead of Latin and in the Scandinavian to their adaptation of the Berzelian nomenclature.

BOTANIC AND CHEMICAL NOMENCLATURES.

It is believed that the present botanic and chemical nomenclatures cannot be improved on. Possibly the designation of synonyms for a few articles would for certain practical reasons be desirable. For example: Thebaicum for opium; also for cocaine, morphine, quinine, etc. It is believed that this would be appreciated by physicians who may then resume writing prescriptions for such articles instead of dispensing them.

The nomenclature of the synthetics is a serious problem and should receive much thought and study. It is again suggested that a systematic scheme be devised to form titles for these complex compounds on the plan followed in the last revision, which is believed to be the best solution of this perplexing question.

THE PHARMACEUTICAL NOMENCLATURE.

The nomenclature of the pharmaceutical preparations is of the most importance and, in view of the constant attempts to its corruption and of its being ignored by even those manufacturers who otherwise try to conform to adopted nomenclature, its adherence should be insisted on.

The medical profession should be vigorously and persistently impressed

with the incontrovertible fact that only in the most scrupulous adherence to the pharmaceutical nomenclature lies safety. It is short, catchy, euphonic, sometimes therapeutically suggestive, often meaningless, coined trade-names, which are the glittering bait held out to the young and unsophisticated practitioner. If he bites, he is lost. Laymen are voracious and will also bite and usually swallow bait, hook and line, leaving nothing for the practitioner but the sad reflection that he was a member of the finny tribe for whom Illinois stands sponsor among the surnames of States.

The nomenclature is the crux of the proprietary medicine question: strict adherence to it will put the wholesale compounders out of business and restore the pharmacist's practice in preparing and compounding.

The following classes were comprised in the U. S. P. 1820, with the number of preparations of each:

Aceta Medica	2	Mellita	3
Aetherea	7	Misturæ	9
Aquæ Medicatæ	29	Pilulæ	23
Cerata	11	Pulveres	7
Collyria	4	Spiritus	3
Confectiones	6	Syrupi	15
Decocta	14	Trochiscæ	3
Emplastra	8	Tincturæ	52
Extracta	16	Unguenta	19
Infusa	23	Vina Medica	10
Linimenta	9		

This comprises 21 classes with 253 preparations. The U. S. P. of 1900 comprises 33 classes with 450 preparations. It will thus be seen that the U. S. P. in 90 years has increased about one-half in the number of classes and not quite doubled in the number of preparations. Roughly considered, the demands of the thirteen original colonies with the "Western Reserve," comprising a population of the State of New York; required one-half as many kinds of pharmaceutical preparations in their Pharmacopœia as does the vast continent with nearly ten times the population gathered from all points of the earth, not counting any provision for Cuba, Porto Rica, Hawaii, or far-distant Guam or the Philippines. Does the little coterie in the territory of the thirteen original colonies recognize that to fully realize its functions the Pharmacopœia of the United States should more nearly be based on the Pharmacopœia Universalis?

The Chair called attention to the striking list of a few pharmaceutical names gathered together here, compiled from eighteen different pharmacopœias, as illustrating the need of some uniformity along this line, and the difficulties of the situation. He said this would be especially noticed in regard to the names of chemical substances. The English Pharmacopœias were quite distinct from the others. Those of the Continental

countries were fairly uniform, and there were many reasons why the pharmacists of America should consider the adoption of the Continental titles. He said there had already been adopted in this country titles for pharmaceutical preparations which were much more uniform than the names of the newer chemical remedies, which offered a very serious stumbling-block.

Mr. Raubenheimer continued the discussion of the subject of nomenclature, in which he said he had always been interested. He pointed out some of the troubles attaching to the nomenclature of chemical products in foreign Pharmacopœias. He agreed with Mr. Hallberg in the view that the nomenclature of the U. S. P. was far superior to that of any of the other Pharmacopœias. The German and Russian titles were an illustration of how confusing to the pharmacists of this country these things could be, and how easily a mistake would be made in putting up a prescription. He gave some illustrations to show this.

Mr. Good said he had never been very much in love with the word "fluidextractum." The idea was, of course, to adhere to the alphabetical arrangement of titles, but there would be no very great violation of that principle by making a group of extracts, and a group of fluids, and in that way the old titles could be given to groups of preparations.

Mr. Lyons did not concur with Mr. Good in this view. He could see no objection to the name "fluidextractum." However, he believed that the Pharmacopœias of the world must come together. He thought the Latin names for chemical compounds could not be discarded by one nation and retained by another. What was needed was to have these things come before a body in which all the nations were represented for careful discussion, and then what was decided there should be accepted by the different nations, just as the Pharmacopœias of the world in the main have accepted a certain strength for tinctures and potent drugs.

Mr. Kebler said he had given the subject of pharmaceutical nomenclature considerable attention, and had found from experience that it was quite satisfactory. One reason why he made this statement, aside from personal observation was, that no one, to his knowledge had ever used the Pharmacopœia as an example of bad nomenclature, and one could rest assured that with the hundreds and thousands of products that were misbranded, if the parties guilty of this practice could have found the bad examples to supplement their views—to in that way have substantiated their views—they would have done so. Mr. Kebler said he could see no objection to the use of the word "fluidextractum." He thought it a little cumbersome at first, but he had come to rather like the word. It was a word that could be readily condensed, and no mistake could be made.

The General Secretary lightened the seriousness of discussion by raising a little stir over the pronunciation of the word "nomenclature." He said he felt sure that Mr. Hallberg would like to know the proper pronunciation of this word, as well as anybody who used it, and that the proper

pronunciation was "*nomenclature*," and not "*nomenclature*." He said that this matter had been settled five years ago in this Section.

Mr. Stevens, Mr. Payne, Mr. Good, Mr. Hallberg and the Chairman all took a hand in the discussion of the correct pronunciation of this word, with the usual result of a difference of opinion.

Going back to the use of the word "*fluidextractum*," Mr. Payne argued for the use of the word, and said it could be readily abbreviated to "*Fl. Ext.*"

Mr. Stevens admitted that this word "*fluidextractum*" had a strange sound to him at first, but he had gotten used to it, and it could be readily abbreviated into "*Flect.*"

Mr. Hallberg said the word was used in this country everywhere, and he believed it was the *German Pharmacopœia's* word. From the start it had been abbreviated into "*Flect.*" He favored the word from the standpoint of safety, and spoke of its value to workers and students.

Mr. Hallberg, referring to his paper, said he thought he had not brought in anything about the elision of the final *e* in the bromides and chlorides, but expressed the hope that this question would not be overlooked, as something ought to be done in the matter. He thought it was a matter that should be decided before the Pharmacopœial Convention. A committee had been appointed from this Section to have a conference with the Section on Pharmacology of the A. M. A., and the Section of the American Chemical Society, in regard to this subject.

The Chair asked if it was desired to decide this question at this time, but Mr. Hallberg suggested that it go over until tomorrow afternoon, and it was so ordered.

The Chair called for the nomination of the officers of the Section for the coming year as the final order of business for the afternoon.

Mr. Stevens said that, following the established custom, he wanted to name for the office of Chairman Mr. A. H. Clark, of Chicago, and for Secretary Mr. William O. Richtmann, of Satsuma Heights, Florida. This motion was seconded by Mr. Stanislaus and Mr. Puckner.

On motion of Mr. Stanislaus, the Section then adjourned.

SECOND SESSION—WEDNESDAY AFTERNOON, MAY 4, 1910.

The second session of the Session on Scientific Papers was called to order by Chairman Wilbert at 3:30 p. m., and the Chair stated that the first order of business was a discussion of the report of the Committee on U. S. Pharmacopœia, "the most important business, perhaps, before this entire meeting."

Chairman Beringer, of the Committee on U. S. P., said that the report was rather voluminous, consisting of some fifty-eight pages, and in addition

there were reports from a large number of sub-committees, and likewise a number of personal investigations which were not complete, which would probably be reported on next year. He suggested that, in order to get the report before the Association in the proper way, it would be best to read it by sections and discuss it. This was agreed to.

The Chair urged the greatest brevity possible on the part of the members in their remarks on the report, as only in that way could the Section cover any considerable amount of ground, and said that to facilitate matters, any section not objected to would be considered as adopted.

Mr. Beringer then proceeded to read the report of the committee as follows :

REPORT OF THE COMMITTEE ON THE UNITED STATES PHARMACOPŒIA.

The report of this year must be considered as a supplement to and a continuation of the voluminous report submitted last year. It is exceedingly difficult to harmonize the views of the members of a committee by correspondence, and no attempt was made to do so, but each member has been encouraged to independently submit his views and results of work accomplished; other subjects were reported on by sub-committees. As the report must be prepared in advance of the annual meeting and without an opportunity for conference, it is deemed advisable to continue the same style as adopted in the report of last year. As the views expressed are largely the personal opinions of individual members that may not be shared by the others, the name of the author is given after each comment.

During the year, there has been some correspondence between the Chairman of the Committee on U. S. P. of the American Medical Association and the Chairman of this committee, endeavoring to establish some plan of co-ordinating the work of the two committees. The desire for co-operation is mutual and while no definite scheme has yet been evolved, the effort should be continued and a plan formulated that will permit of the extension of the fraternal relations between these two committees and the establishment of systematic co-operative work on selected subjects and along fixed lines for each committee.

Like the preceding report, it is composed very largely of criticisms, yet it is hoped that at least a fair proportion of these may be of assistance to the committee on revision. It is recommended that copies of these reports be filed with the Convention for the use of the Committee on Revision.

ADMISSIONS AND DISMISSALS.

This is always a bone of great contention, yet it is one of the problems that must be decided early, and decided on some definite plan, before the revision can make much progress. In the pre-conventional discussions a wide divergence of opinion has been evidenced. Among some of the medical writers, the attempt to reduce the official list to their personal views and individual preference is apparent. Equally erroneous is the proposition that the Pharmacopœia should comprise only drugs and remedies tested pharmacologically and that admissions should be decided on the basis of established therapeutic activity. This beating of scientific tom-toms has sounded well and has attracted the unwary and may even lead a few pharmacists astray. The pharmacopœia never has been and never can be made an authority on therapeutics and no pharmacopœia has ever been compiled on such a basis. Who is to decide the medicinal action and value of each drug? The pharmacologists' and the chemists' decisions are disputed

by the practical clinician and no two doctors will agree upon the relative merits of the drugs contained in any comprehensive list. This is demonstrated by medical history and practice throughout all the ages and the profession has always been divided into schools and camps each with their views as to the proper remedies that should be used.

The pharmacopœia is and must remain a book of standards for medicines used sufficiently to warrant standardizing and uniformity in formulas. It cannot be a book for one class of physicians or section of the country, but must be broad and comprehensive enough to serve the reasonable needs of all physicians in all parts of this country.

The tendency in the recently published foreign pharmacopœias is toward an extended list of official articles, and this is well illustrated in the recent revision of the French Codex, and the same needs exist here and must be recognized. There is special danger to the pharmacists in a too restricted list, as it leaves them without standards and authoritative formulas for many of the articles dispensed. Use and use alone should decide the admission of any article and *entire disuse* the dismissal.

It is interesting to note some of the suggestions that have been made for admission and deletion and the effect such changes would have on the character of the book and the practice of pharmacy. For example, consider some of the recommendations from the American Medical Association. The Section on the Practice of Medicine recommends the dismissal of lard. The adoption of this would necessitate endless changes in the appearance and formulas for ointments and cerates. Also the deletion of such well known vegetable astringents as geranium, *rhus glabra*, *rubus* and *krameria*, with all of their preparations even yet quite frequently prescribed. Also oil of coriander and cassia fistula, ingredients in confection of senna and syrup of senna. Also fluidextract of sabal which has never been official. The declaration for the dismissal of compound powder of acetanilide is accompanied with the statement that "There does not seem any reason for retaining this combination." But as the members of this same Association annually prescribe and dispense several tons of this powder, should there not be a fixed standard?

The Section on Ophthalmology recommend that mitigated lunar caustic, oleate of atropine, and extract of stramonium should be dropped. Of course there had never been any field of use for these in their special practice, but how about their fellow practitioners who prescribe stramonium extract in ointments and suppositories. These examples simply serve to illustrate that the view-point of the recommender must be considered. It is not the opinion of the medical author or expert that must in this matter be alone accepted, but the needs of the entire army of doctors in active practice throughout the entire country must decide. No small committee of experts can decide for the medical profession what it shall prescribe and what it shall not prescribe, and any such attempt at limiting the armamentarium of physicians will fail.

The Committee are of the opinion that the use of the following items makes them worthy of consideration for admission to the official list, provided that they are not controlled by patent or trade-mark rights:

Acid, Acetyl Salicylic,
Adrenalin Hydrochloride,
Ammonium Hypophosphite,
Ammonium Sulph-Ichthyolate,
Antipyrine Salicylate,
Berberine Hydrochloride,
Bismuth Betanaphthol,
Bryonia,
Calcium Glycerophosphate,
Calcium Lactate,
Catechu,
Chlorobutanol (Chloretone),

Chlorobutanol (Chloretone Inhalant),
Cinchonidine Salicylate,
Cotarnine Hydrochloride (Stypticin),
Cotarnin phthalate,
Creosote Carbonate,
Crocus,
Diethyl Barbituric Acid (Veronal),
Dimethyl Antipyrine (Pyramidon),
Fluidextract of Cottonroot Bark,
Fluidextract of Sabal,
Fluidextract of Zea,
Fluorescein,

Glycocholates,	Saccharin (Soluble), the Sodium Salt of
Colalin,	Benzosulphimide,
Chologestin,	Salophen,
Holocaine Hydrochloride,	Silver, proteid salt,
Homatropine Sulphate,	Sodium Cacodylate,
Hydrastine Hydrochloride,	Sodium Cinnamate,
Iron Valerate,	Sodium Glycerophosphate,
Liquor Alumini Acetatis, N. F.,	Sodium Perborate,
Maranta,	Sodium Peroxide,
Mass Copaiba,	Sodium Succinate,
Morphine Diacetyl,	Strontium Lactate,
Morphine Diacetyl Hydrochloride,	Strychnine Arsenate,
Morphine Ethyl Hydrochloride,	Succinic Dioxide (Alphozone),
Napthol Benzoate,	Suprarenaline Alkaloid,
Novocaine,	Theobromine,
Oleoresina Apii (Green Apiol),	Theobromine-Sodium Salicylate,
Papaw, enzyme preparation,	Thiocol,
Phenolphthalein,	Thiosinamine,
Potassium Glycerophosphate,	Tincture of Bryonia,
Potassium Guaiacol Sulphonate,	Tincture of Pulsatilla,
Quinine Ethyl Carbonate,	Zinc Carbonate Impure,
Euquinine,	(Calamine).
Quinine Valerate,	

The following articles now official appear from the data in the possession of the Committee to be no longer used sufficiently to require recognition, and unless other information of use is reported, we are of the opinion that their dismissal should follow :

Acetum Opi,	Hedeoma,
Alumin. Hydroxidum,	Iodol,
Ext. Scopola,	Matico,
Fld. Ext. Eupatorium,	Mezereum,
Fld. Ext. Matico,	Pimenta,
Fld. Ext. Mezereum,	Scopola,
Fld. Ext. Staphisagria,	Preparations,
Gambir,	Troches of Gambir.

REPORT OF SUB-COMMITTEE ON REVIEW OF FOREIGN PHARMACOPŒIAS.

It seemed desirable to limit the report this year to two points, viz., the relation of the U. S. and other pharmacopœias to the Brussels treaty and the extent to which foreign pharmacopœias have included substances proposed for admission to the U. S. P. by the committees of the A. Ph. A. and A. M. A.

(1) The Brussels Treaty. The Brussels protocol was prepared in 1902 and the treaty signed in 1906. Mr. Wilbert, in a paper recently prepared, has given the results of an examination and comparison of thirteen pharmacopœias issued since the Brussels Conference. It is largely from this paper that the following facts are taken. There has been a remarkable degree of conformance with the International Standards. Thus as to the requirement of per cent. of drug strength in the case of the most important drugs: of a total of 260 titles, 131 did not comply before the Conference; now all but 15 do comply. Of these 15 cases of non-compliance, five, or one-third, occur in the U. S. P.

As regards the *total* number of compliances, however, the U. S. P. stands far behind that of any other nation. In this connection Mr. Wilbert states:

"It has been pointed out by Greenish and others that of the first national pharmaco-

poeias to be published after the signing of the protocol at Brussels, in 1902, the Spanish Pharmacopœia leads by conforming to 96 per cent. of the requirements; the Belgian Pharmacopœia conforms to 87 per cent.; the Dutch Pharmacopœia, 81 per cent.; the Austrian Pharmacopœia, 77 per cent., and the Pharmacopœia of the United States to but 27 per cent. of these requirements. To arrive at these results, Belgium was compelled to modify 80 per cent. of the formulas, Spain 75 per cent., Holland 30 per cent., and Austria but 6 per cent. of the corresponding formulæ contained in the previous editions. Henry G. Greenish (Pharm. Journ., June, 1907, p. 832), in further discussing the same question makes the following comment: "The conspicuous failure on the part of the United States to bring its formulas into harmony with those of the agreement, as shown by the tables, and also the notes on the various preparations, is the more remarkable when considered in conjunction with the statement in the preface (of the U. S. P.) that 'the recommendations of this (the International) Conference have been adopted by the Committee of Revision except in one or two instances.' The more evident variations are in the nomenclature of the official substances, the strength of menstruum and the general non-compliance with articles 2 and 3 of the protocol."

Mr. Wilbert states further:

"In a paper on the then newly-proposed international standard tinctures of potent remedies (Am. J. Pharm., 1903, v. 75, pp. 20-27) I ventured the opinion that: The advantage that must be admitted in favor of the proposed international standard menstruum is that it would be uniform in strength for all extractive tinctures of potent drugs; that the keeping qualities of the preparations would be improved; that a smaller proportion of the inert materials would be extracted, and that, therefore, less precipitation would take place.

"The opinions expressed at that time have been amply verified in practice. With the single exception of tincture of ipecac, international standard tinctures, made more than seven years ago, are still clear and evidently satisfactory, while corresponding preparations, made with the U. S. P. VII menstruum of diluted alcohol, generally precipitated heavily within a few years at most.

"One perhaps important feature in this connection is that approximately 70 per cent. alcohol has long been recognized as being a much more efficient antiseptic than either more dilute or more concentrated mixtures of alcohol with water. This one property of 70 per cent. alcohol alone should warrant its careful consideration, on the part of the next U. S. P. Committee of Revision, for adoption as a routine menstruum in place of the diluted alcohol now generally prescribed."

The degree of non-compliance with the International Standards of the U. S. P. as compared with that of the pharmacopœias with which the Spanish translation of the U. S. P. comes most into competition (viz., the French and Mexican) is especially striking. In speaking of the adoption of the normal drop-counter recommended by the Brussels Conference the Mexican Pharmacopœia states:

"In pharmaceutical practice measures of capacity should not be used, but all medicaments, in general, should be weighed. When it is necessary to measure by drops any small quantity of liquid, use should be made of the *Normal drop-counter* prescribed by the Brussels Conference."

The introduction to the Venezuela Pharmacopœia states as one reason why the U. S. P. is not suited to use in Venezuela is that it does not provide for the use of the metric system as followed in that and other countries using the metric system.

(2) Admissions. The accompanying table shows the extent to which a number of the drugs proposed for admission to the U. S. P. by the Committees of the A. Ph. A. and of the A. M. A. are contained in foreign pharmacopœias.

(3) In connection with the frequently made argument that a number of the less widely used drugs should be retained in the U. S. P. in order to have legal standards for

them and the suggested remedy of stating that the standards for drugs dismissed from the 8th Revision shall continue to be valid, it is interesting to note that at least two foreign pharmacopœias (the French and the Servian) already follow this plan.

PHARMACOPŒIA.

	Austrian.	Argentine.	Belgian.	British.	Danish.	Dutch.	French.	German.	Hungarian.	Italian.	Japanese.	Mexican.	Norwegian.	Russian.	Spanish.	Swedish.	Swiss.
Adrenalin hydrochloride.....	x		x				x		x	x	x	x					
Caffeinæ sodio-benzoas.....	x		x		x			x	x	x	x						x
Caffeinæ sodii salicylas.....			x		x	x		x	x	x	x		x	x			x
Calcium lactate.....			x		x				x	x					x		
Cotarnin hydrochloride.....											x						
Diacetyl morphin.....									x	x	x		x				x
Morphine ethyl hydrochloride.....								x ¹			x						x
Nitrous oxide.....												x					
Novocain.....								x ¹									
Oxygen.....							x		x		x				x		
Phenolphthalein.....								x ¹									
Proteid silver compound.....	x		x					x ¹		x	x						x
Sodium arsanilate.....								x ¹									
Sodium cacodylate.....							x		x								x
Tannin protein derivatives.....	x		x			x		x ¹	x			x				x	
Tetanus antitoxin.....			x				x										x
Theobromin.....	x	x				x	x					x			x	x	
Theobromin sodio-salicylate.....	x		x		x	x		x	x	x	x				x	x	
Trioxyme hylene.....			x				x			x							
Tuberculin ²		x					x	x			x						x
Vaccine virus.....		x															x

As the associate member of the Sub-Committee on Review of the Foreign Pharmacopœias, I am compelled to dissent from some of the views expressed above by my colleague concerning the Brussels International Conference of 1902 and the compliance or non-compliance of the U. S. Pharmacopœia with its recommendations. Some of the criticisms directed at the U. S. P. in this connection are hardly fair as the critics should know that at the time this treaty was signed the 8th Revision was most likely going through the press and the time would not permit of a more thorough consideration of many of the debatable questions or radical changes proposed in these recommendations.

One of the delegates of the United States points out in his recorded account of this Congress that all of the previous international conferences had failed to accomplish the purpose intended and had been unproductive of any very definite or substantial results. The chief and most important distinction of this conference of 1902 "was its restriction to the consideration of plans for securing international uniformity in strength of potent remedies only. As a result of this limitation of its scope it is believed to have satisfactorily accomplished its task and to have achieved a measure of success which was not possible with undue range of discussion—which had characterized and rendered ineffective all preceding pharmaceutical congresses."

In so far as the discussion and the conclusions were limited to this scope for which

¹ Proposed for admission to Ph. G. V by Imperial Board of Health.

² Not recommended by Committee on Vaccines, etc., of the A. M. A., on ground that there is no satisfactory standard. (REID HUNT.)

the delegates were assembled and empowered to consider, they have been generally approved and to a very large extent adopted in the United States Pharmacopœias VIII and in the foreign pharmacopœias published in recent years. But in the course of the proceedings, Dr. Power records that "Some *special propositions* were presented for consideration by a few of the delegates and these comprised a considerable number of detailed suggestions that had been previously elaborated and printed." "The delegate from Denmark likewise submitted special propositions for the unification of formulas for tinctures and medicinal wines, and for the adoption of the normal drop-counter of the French Codex of 1884." It is thus very plain that the congress busied itself with a great many subjects on which the delegates were not authorized to consult and commit their respective countries. It has been largely these "extra" subjects that have caused the greatest amount of criticism. It is recalled also that no harmonious conclusion could be reached about many of the subjects contained in the preliminary lists and these of course are not included in the articles of the protocol. It is particularly unfortunate that digitalin and aconitine were two of these for which international standards are especially desirable. While there are many excellent points in the articles covering the agreements it is exceedingly doubtful if some of these would not be changed if another conference was to be held at this time.

From an American way of thinking and working, the European continental method of weighing liquids and solids and the finished product is very unpopular and is not likely to be again attempted in this country. The failure of the effort in the U. S. P., 1880, demonstrated that this "will not go" in this country. Yet it was one of the leading features in the Brussels protocol.

Personally, I am far from being convinced that the U. S. P. has committed any error in not adopting 70 per cent. alcohol as the universal menstruum for the tinctures of potent drugs. It does not appear to be likely that this is the best menstruum for the extraction of drugs of such varying physical characters and chemical constituents. The critic admits that the tincture of ipecac was not satisfactory, and I fail to see how 70 per cent. alcohol can extract cantharides when it is difficult to exhaust the drug in making the tincture with alcohol.

Considerable criticism has been directed toward the pharmacopœia because of its failure to adopt the so-called "international nomenclature." It does not appear that the congress was clothed with authority to dictate pharmacopœial titles and the names used in the protocol were simply "proposed" and not mandatory, and were in each case accompanied by one or more alternatives and in tincture of nux vomica, wine of antimony and fluidextract of ergot the choice is offered in each of four different names. This does not indicate that universality of pharmacopœial names was expected.

International nomenclature is one of the idealistic dreams like that of a universal language and universal peace and other Utopian ideas that from a purely ethical standpoint look very inviting, but are not practical in the present state of the nations. It must be admitted that a large number of the pharmaceutical names are for substances not known in ancient or mediæval times and for which we have consequently no classical Latin names, and so new names have to be coined according to the fancy of the author of the name and the custom of the time and nation. The same method is shown in many of the Latin names for plants and animals. Consequently we cannot find any universal rule governing pharmacopœial titles, each being guided largely by the customs and idioms of its own national language. It has become quite common to Latinize either botanical or the vernacular name of the drug or else a name under which it is prescribed by physicians. Very often the predominating idea is to prevent error and safeguard the patient, and after all is this not the most important consideration? Take, for example, the three names "proposed" by the Brussels Congress for Fowler's solution of arsenic—*Arsenicalis Liquor Fowleri*, or *Liquor arsenicalis Fowleri*, or *Kalii arsenicosi liquor*. Could our

American physicians be induced to use either of these, or would the Pharmacopœia be justified in making a change in the present well-established title, creating misunderstanding and the liability to error?

Accepting Dr. Power's record of Article III of the protocol as a correct translation, the language used impresses me as if the delegates realized that this was one of the "extra" or "special" propositions not considered in the call and their authority did not extend to a binding conclusion. It is certainly far from a binding or even a positive declaration in favor and reads: "*It would be expedient* to adopt a normal drop counter, of which the external diameter of the dropping tube should be exactly 3 millimeters. In other words at a temperature of 15° C., and with distilled water, 20 drops should be equivalent to 1 gramme." Here again the difficulty comes in from the variance of American medical practice from the continental. If the normal drop counter could be based on the minim which is still the dosage drop that a majority of physicians have in mind it might meet with their favor (G. M. Bernger).

GENERAL PRINCIPLES TO BE OBSERVED IN THE NINTH REVISION OF THE U. S. PHARMACOPŒIA.

On the eve of the convention for the ninth decennial revision of the Pharmacopœia, it is very appropriate and likewise very important that the members of this Association who are so vitally interested in the results of that convention and the establishment of standards that are absolutely correct, should give expression to their opinions and desires concerning the general principles that are to be observed in the work of revision. This is all the more important at this time as other interests have proposed certain untenable theories the adoption of which would be detrimental to the welfare and progress of true pharmacy.

Consequently, the committee have formulated a number of propositions each presenting some special subject as a principle to be observed in the revision and these are submitted for discussion with the hope that they will assist in crystallizing sentiment and serve as the basis for a satisfactory expression of your opinion and requests to the pharmacopœial convention.

1. *Scope.*—The Pharmacopœia shall be a book of standards for such substances as are sufficiently used as remedial agents to warrant recognition and the fixing of proper standards. We recommend that the limitations to the scope of the Pharmacopœia adopted for the 8th Revision and set forth in article I (See Introduction U. S. P. VIII-XXX) be re-adopted for the next revision.

2. *Function.*—The Pharmacopœia is not to be considered as an authority on therapeutics and the admission or deletion of any article is not to be considered as an indication of its medicinal value.

3. *Doses.*—That doses be continued in the Pharmacopœia under the rule adopted for the 8th Revision and that these be corrected wherever necessary, and that in addition, for potent remedies the maximum single and the maximum daily doses also be given.

4. *Nomenclature.*—That the present rule relating to changes in titles (Introduction fol. XXXI) be re-adopted with only such modifications as are necessary to comply with the subsequent suggestions.

5. *Botanical Names.*—That changes in the present botanical names be made only for well-defined reasons and such changes shall conform to the rules of the International Botanical Congresses.

6. *Names for Synthetic Chemicals.*—That for synthetic chemicals with lengthy chemical names, the committee coin wherever practical short euphonious titles contracted from the true chemical names and that the latter be always given as one of the English titles.

7. *Purity Rubric.*—That the purity rubric as introduced in the eighth revision be continued and extended wherever practical and especially as related to crude drugs.

8. *Improved Descriptions and Definitions.*—That the official definitions and descriptions be carefully revised so as to meet the present need as legal standards.

9. *Committee on Drug Markets.*—That the Committee on Revision be requested to appoint a special committee to make a thorough investigation of the quality of crude drugs in commerce both in this country and abroad, and to co-operate with the U. S. Government Departments in such investigations and that this committee be instructed to endeavor to determine the proper limits to variability due to soil and climatic condition or improper handling, and to suggest such improvements as can be introduced in collecting and marketing such wares.

10. *Standards for Crude Drugs.*—That reasonable and proper standards be introduced for crude drugs wherever practicable that will insure a satisfactory quality for the pharmacist and exclude substandard, fictitious or adulterated materials.

11. *Standards for Powdered Drugs.*—That titles and standards be introduced for such drugs as are properly used in the ground or pulverized condition and where the standards for the whole are not applicable to the powdered drug.

12. *Assay Processes.*—That the assay processes be extended to all drugs and preparations permitting of satisfactory testing in this way, and that identity tests for the purity of the isolated active principle be included wherever possible.

13. *Pharmacognostic Descriptions.*—That with the description of a crude drug, brief pharmacognostic descriptions both macroscopic and microscopic where possible be given, and the appearance of the structural elements in the powder when examined microscopically as a means of detecting adulteration.

14. *Methods of Storing and Preventing Deterioration.*—That instructions be incorporated for the proper storing of each article and methods of preventing deterioration.

15. *Time Limit on Drugs.*—That a time limit of permissible use be fixed on each drug and preparation that is prone to deterioration or change of active constituents.

16. *Fineness of Powders.*—That the designation of the fineness of powders be continued to be stated in terms of the number of meshes to a linear inch of a sieve through which the powder will pass, and that the diameter of the wire in the official sieves be fixed.

17. *Powdering Drugs.*—The powdered drug to represent the entire drug. Where the drug can be powdered without residue this should be required; in other cases, the allowable tailing or residue should be determined.

18. *Synonyms.*—That the proper English name under which the article is commonly sold be given along with the Latin title of each drug and preparation, and that a list of less important or less frequently used names be published with the other tables as a table of synonyms.

19. *General Processes.*—That type processes and general formulas be introduced wherever possible so as to prevent useless repetition in the text of formulas.

20. *Descriptions of Galenicals.*—That terse and concise descriptions of the official preparations be given after each formula.

21. *Sterilization.*—That a chapter on sterilization be introduced describing the proper methods for sterilizing medications and apparatus, and indicating to what preparations each method is especially applicable.

22. *Atomic Weights.*—That the current International Standard of Atomic Weights be adopted for all official chemical formulas and calculations based thereon.

23. *Structural Formulas.*—That structural formulas be not given in the revision of the U. S. P.

24. *Discriminating Tests for the Druggist.*—That the simplest identification tests for the needs of the pharmacist be stated first in the list of tests and be in special type.

25. *Official Methods for Physical Constants and Chemical Determinations.*—That there be included official methods for determining the usual analytical data such as

specific gravity, melting and congealing points, ash, solubility, extractive, percentage of water, alcohol, ether, etc.

26. *Normal Temperature*.—That an agreement be made between the Committee on Revision and the United States Bureau of Standards by which a uniform official national normal or standard temperature shall be established for determining such constants as specific gravity and solubility, and at which apparatus should be certified.

27. *Definition of Admitted Impurity*.—That the character and composition of the innocuous impurities allowable in medicinal chemicals be stated with proper limitations and tests.

28. *Distinction between Medicinal and Technical Substances*.—That the statement relating to substances sold solely for medicinal purposes in the preface of the 8th Revision page XXXIX be re-incorporated in the 9th Revision, and that the principle involved be stated clearly and more forcefully if possible.

29. *Weights and Measures*.—That the metric system of weights and measures only be used in the descriptions and formulas.

30. *Alcohol Content*.—That with each formula for a preparation containing alcohol, the average alcoholic content of the product be given.

ASSAY PROCESSES FOR ORGANIC DRUGS.

REPORT OF CHAIRMAN OF SUB-COMMITTEE ON ALKALOIDAL ASSAY PROCESSES.

It has not been possible for the sub-committee to carry out any systematic study of the assay processes of the Pharmacopœia. These processes have been freely discussed in current pharmaceutical literature, and the new committee will have the benefit of a multitude of criticisms and suggestions, the value of which can be determined only by patient experimental work. Some of the newer Pharmacopœias, notably the Swiss, have adopted innovations in the general plan of alkaloidal assays as well as in many details of the processes, all of which must be studied with unbiased mind by the new committee. Only a few specific recommendations, therefore, will be offered here.

1. The paragraph on alkaloidal assay by immiscible solvents, p. 578 of the present Pharmacopœia, should be rewritten and should include a general assay process in full detail (a) for crude drugs and (b) for fluidextracts. The general process may well be modeled after that adopted by the Association of Official Agricultural Chemists. In the text of the Pharmacopœia, specific assay processes should be given only where the general assay process is inapplicable, or requires material modifications. Otherwise reference should be made to the model process in the Appendix. It will be the task of the new committee to make the model processes as universally applicable as possible.

2. In assay processes for different preparations of the same drug, details as far as possible should be carried out in precisely the same manner, and the directions should be given in the same words.

3. *Aconite Assay*. The new committee should ascertain whether there is any real reason why aconite should not be assayed by the same general method as belladonna, etc., and should also test the question whether alkalimetric titration of the alkaloid obtained in the assay of this drug is not liable to lead to grossly erroneous conclusions. It is certain that titration results often indicate more "aconitine" than the actual weight of the crude alkaloid. The gravimetric method of the new French codex should be investigated and may possibly prove to be satisfactory.

4. *Cinchona Assays*. In assays of cinchona bark, a preliminary treatment of the powder with hydrochloric acid on a steam bath seems to be a capital improvement, insuring complete extraction of the drug, and materially shortening the time of the assay.

In determining the "ether soluble" alkaloid, in the present pharmacopœial assay, the ethereal solution is kept at a temperature of 15°C. ten minutes to allow the less soluble

alkaloids to crystallize out. The time is insufficient, unless the separator containing the solution is shaken continuously during the ten minutes—and in summer it is not easy to maintain the required low temperature while the shaking is in progress. The time should be extended to 30 minutes, a vigorous shaking of the separator for at least a minute in the outset being prescribed.

The quantity of "ether soluble" alkaloid determined by this very simple procedure seems quite as satisfactory a criterion of the therapeutic value of the drug as any determination that can be easily made of the single alkaloid, quinine.

5. *Conium Assays*.—It is simpler and better to determine coniine by alkalimetric titration than by weighing as in the pharmacopœial assays.

6. *Colchicum Assays*.—The colchicine obtained in the present assay processes is never quite pure, and in the attempt to remove impurities one is liable to lose alkaloid. A method of determining the alkaloid by titration is a desideratum. The old method by Mayer's reagent gave good practical results although chemists denounced it as empirical. Recently this titration has been placed on a scientific basis by Dr. Gunner Heikel, and his method certainly deserves the consideration of the new committee.

7. *Opium Assay*.—The convenient lime process for determining morphine in opium involves of necessity the principle of an aliquot part, and hence it is not likely to find favor with the new committee. The alternative method of precipitating the morphine from a concentrated aqueous solution by ammonia in presence of ether has been very generally accepted, but yields an alkaloid far from pure, and what is of more serious consequence, containing an impurity having an alkaline reaction. Several methods have been proposed for eliminating this troublesome impurity. Perhaps the best of these is precipitation of the concentrated aqueous solution with alcohol. Other plans are to get rid of calcium at the outset by the use of ammonium oxalate, or to add to the concentrated solution a small quantity of ammonia, and filter out the precipitate formed.

Another expedient is to modify the titration process in such a way that the impurity does not affect the result. This may be done by dissolving the crude morphine in an excess of lime water, quantity accurately measured, allowing the insoluble matter to subside, and determining in an aliquot portion of the solution total alkalinity.

These alternative plans for the improvement of the opium assay process should be carefully studied by the new committee, results of the studies of the Association of Official Agricultural Chemists being also taken into consideration. (A. B. Lyons, *Chairman*.)

OPIMUM ASSAYS—CRITICISMS.

1. *Agitation*.—The Pharmacopœia says "Agitate it every ten minutes (or continuously in a mechanical shaker) during three hours." In my opinion the amount of shaking is of much importance, and certainly shaking every ten minutes during three hours, is by no means the equivalent of shaking continuously in a mechanical shaker for three hours.

2. *Transference of the moist Opium back to the flask by means of a spatula*.—Most operators find it difficult to transfer *all* the opium back into the flask by means of a spatula. I find that after the first filtrate has been collected, it is much easier to perforate the filter, and thus transfer the still moist opium back to the flask, completing the transference by washing the residue on the filter back into the flask by means of the 50 Cc. of distilled water prescribed for the second extraction. The third filtrate may be obtained in same manner.

3. *Exhaustion of the Drug*.—I find that in many instances, where the directions of the Pharmacopœia have been followed carefully, the drug is still not exhausted. In my opinion, the directions should include the injunction to collect the filtrate until the drug is exhausted, which is to be shown by an appropriate test.

4. *Evaporation of the Filtrates*.—The Pharmacopœia directs as follows: "Evaporate

carefully in a tared dish, first, the second filtrate to a small volume, then add the first filtrate, rinsing the vessels with the third filtrate," etc.

The word *carefully* is in my opinion badly chosen. We all know what a general term means to many people. I think it should be explicitly stated that the evaporation be carried out on a water-bath.

5. *Transference of Crystals for Purpose of Weighing*.—The Pharmacopœia states: "Then carefully transfer the crystals to a tared watch-glass, and weigh."

Again the term "*carefully*," I have noted in some instances that it was difficult to remove the crystals. At other times the operator succeeds in transferring parts of the filter paper to the watch-glass. I have found no difficulty in using counterpoised filters for the double filter used, and in weighing the crystals on the filter.

6. *Using Lime Water*.—I believe more stress should be laid on the necessity of carrying on the filtration with rapidity, thus avoiding the formation of undue quantities of calcium carbonate. (Geo. C. Diekman.)

I believe that the opium is thoroughly exhausted if the official directions are carefully followed, but I have found it an advantage in the assay of moist gum opium to incorporate the gum in a mortar with an equal weight of dried and washed sea-sand, washing all into the flask. This favors mechanical subdivision and makes exhaustion easy. In the assay of the tincture and deodorized tincture we find it advantageous to evaporate the tincture with the addition of 5 grams of purified talcum. This tends to prevent the precipitation of resinous flakes and facilitates subsequent washing.

Instead of treating the whole of the crude morphine with lime water, I prefer to powder the crude morphine in a small mortar and weigh out exactly 0.5, which is treated with lime water to determine the presence of insoluble matter; then a calculation is made for the whole. Working with this small quantity greater rapidity and accuracy are obtained and a notable quantity of morphine from many assays accumulates for other use.

In relation to titration, instead of washing with lime water, before this is depended upon, it should be determined that the natural lime salts precipitated with the morphine do not use any of the acid solution.

In the assay of extract of opium the Pharmacopœia directs that 4 grams of extract shall be dissolved in water to make a total of 15 grams of aqueous liquid, and that this should be mixed with 8.5 Cc. of alcohol, 20 Cc. of ether and 2.2 Cc. of ammonia water. As the amount of liquid is three-fourths that used in the regular assay, and the amount of extract of opium is of official strength, represents only two-thirds the amount of morphine as represented by the amount of opium used in assay, the proper proportions of alcohol, ether and ammonia water are not used. If three-fourths of the liquids used in the regular ammonia-opium assay were used to represent three-fourths the amount of aqueous liquid, the figures would be: Alcohol, 9.15 Cc.; Ether, 18.75 Cc.; ammonia water, 2.625 Cc. This slight change in the character of liquid is not advisable, for it must have some influence on the precipitation of morphine. It would be better to start with 6 grams of extract of opium, which amount would represent the same amount of morphine as 10 grams of official powdered opium; then make the aqueous washings up to 20 grams and precipitate as in the regular opium assay.

The directions on page 145, lines 5 and 6 (for at least six hours, or over night) should be changed to (for at least 16 hours). (E. I. Patch.)

This suggestion for the use of purified talcum in the manipulation of the assay for tincture of opium is in harmony with the recommendation made by Charles Bullock, recommending the use of kaolin for the same purpose. (See American Journal of Pharmacy, 1887, page 127.) I have frequently used kaolin since Mr. Bullock's suggestion. Probably keiselguhr is still better. (George M. Beringer.)

REPORT OF SUB-COMMITTEE ON PHYSICAL CONSTANTS AND STANDARDS.

The object sought in the pharmacopœial description of a drug is simply to render its identification certain and complete. In the case of a definite chemical compound, therefore, such descriptions would be comprehended in a single very short paragraph. Since, however, we depend in practice very largely upon information given us instantaneously by our senses, it is natural and right that in all cases a succinct statement of the sensible properties of the article be included in the description, and there is equally good reason for including likewise its more conspicuous physical properties. This practice in fact is followed by every pharmacopœia.

Descriptions of sensible properties almost of necessity lack scientific precision, although collectively they often suffice to render identification of a drug quite certain. Physical properties, on the other hand, admit of exact scientific definition, and hence are of greater intrinsic value than sensible properties. The physical properties which are of especial importance are: 1, solubility in various liquids; 2, density or specific gravity; 3, optical properties; 4, congealing and-boiling points. These will here be considered briefly in order.

SOLUBILITY.

In the great majority of cases approximate statements with regard to the solubility of a drug in the ordinary solvents, particularly in water and alcohol, answer every useful purpose in a pharmacopœial description. In absence of exact determinations, the degree of solubility may well be indicated by the use of certain adverbs, to each of which should be attached a well-defined meaning. A substance requiring for solution more than 200 times its weight; up to 1000 perhaps, would be described as very sparingly soluble; 1:50 to 1:200 as sparingly soluble; 1:16 to 1:50 moderately soluble; 1:8 to 1:16 readily soluble; 1:3 to 1:8 freely soluble; and 1:3 or less very freely soluble. It is better of course to give a definite approximate figure as about 1:75 or about 1:87, the use of the qualifying adverb indicating that some slight variation from the figure given might be expected. It should be explained in the Introductory Notices that the expression soluble in distilled water 1:75 at 20° means that 7.5 grams of a solution saturated at 20° under specified conditions will contain 1 gram of the substance. Only in exceptional cases is the exact degree of solubility of the substance an important criterion of its identity or purity. Here omission of the qualifying adverb "about" indicates that the figure given is authoritative and exact.

DENSITIES OR SPECIFIC GRAVITIES.

No physical property of a liquid is more easily ascertained in exact figures than its density or specific gravity. It would seem desirable that in the description of any substance its density rather than its specific gravity should be stated, *i. e.*, the weight in grams of a volume of the substance equal to that of one gram of water at maximum density. It is a little easier possibly to ascertain the specific gravity of the substance, *i. e.*, the weight of a volume equal to that of one gram of water at the same temperature, and hence it is specific gravities rather than densities that are commonly given. The present Pharmacopœia gives in its specific gravity tables, and likewise sometimes at least in its text, apparent, not true, specific gravities. In other similar publications it is almost invariably true specific gravities that are given. The figures should certainly be changed to bring our pharmacopœia into harmony with others in this respect. This means that all pyconometer weighings shall be reduced to "vacuum." A table should be furnished showing the corrections to be made for displaced air, and also the apparent weight at standard temperature of one liter (or 1 Cc.) of water. The question of standard temperature will come up once more, inasmuch as our pharmacopœia stands alone in assuming as that standard 25° C. While 25° is convenient and rational, the fact must be con-

sidered that the U. S. Bureau of Standards has adopted 20° , which is better than the 15° of continental Europe. If the Bureau cannot be induced to see the advantage of the more radical change (to 25°), we can "compromise" on their standard with some hope that the change will be generally adopted in America.

To sum up; we recommend that in the text of the Pharmacopœia true densities, standard 20° (vacuum) be given; in the specific gravity tables, true specific gravities, standard 20° (vacuum).
 4°
 20°
 20°

OPTICAL PROPERTIES.

In addition to the specific rotatory power over the polarized ray of certain organic substances—a property which enables us to discriminate between substances otherwise closely similar, and often to detect sophistications, the index of refraction of substances, particularly liquids, is a physical property occasionally of great importance. It will be well for the new committee to consider the advisability of including this among the data which should enter into a complete pharmacopœial description.

MELTING AND BOILING POINTS.

The exact method for determining melting, congealing and boiling-points should of course be prescribed in the Pharmacopœia.

ATOMIC WEIGHTS.

In this connection, it is in order to call attention to the fact that the U. S. Pharmacopœia is quite out of date in adhering to the basis for atomic weights of $H=1$. Chemists almost universally use the International Atomic Weights, based on $O=16$, and it is time for our pharmacopœia to fall into line. The importance of this becomes manifest when we consider that the volumetric solutions of the Pharmacopœia do not agree in strength with those commonly used in chemical laboratories, or those supplied by dealers in chemicals. The difference is quite appreciable, amounting to three-fourths of one per cent. (A. B. Lyons and L. F. Kebler.)

OFFICIAL FORMULAS AND PREPARATIONS.

Waters.—Instead of having formulas for the various waters requiring 2 Cc. of oil to 1000 Cc. of water a general formula suggesting this proportion should be included, and anise, cinnamon, fennel, peppermint and spearmint dropped, as distinct formulas. (E. G. Eberle.)

Hamamelis Water.—I think ought to be transferred to the N. F.; at least directions for making should be omitted; few if any druggists make it. In the test the strength solution of salicylic acid ought to be specified, say 1 Gm. in 1000 Cc. (E. G. Eberle.)

Solution of Hydrogen Dioxide.—Ought to allow for alkalinity (if made from perborates). (E. G. Eberle.)

Stronger Rose and Orange Flower Waters.—There is no standard of strength for stronger rose and orange flower waters, dilutions would vary. why not simply have orange and rose water official? (E. G. Eberle.)

Elixirs.—Dissolve the oils in the alcohol, add the water and percolate (?) through sugar. Transfer elixir adjuvans to the N. F. elixir of iron, quinine and strychnine phosphates replace by elixir of iron, quinine and strychnine of the N. F. Have the phosphates as such in this elixir any medicinal advantage over other salts? I doubt it. Introduce the tincture of citro-chloride of iron N. F. (E. G. Eberle.)

Emulsions.—Drop emulsions. Their place is in the N. F. (E. G. Eberle.)

Glycerite of Boroglycerin.—Omit the formula, only a few druggists make it. (E. G. Eberle.)

Compound Antiseptic Solution.—Would be improved by the addition of a small amount of glycerin. (E. G. Eberle.)

Mucilage of Acacia.—Make fresh when needed by simple solution in water and omit the lime water. (E. G. Eberle.)

Spirits.—My experience is that only few druggists make spirit of nitrous ether. I believe, therefore, ethyl nitrite ought to be official. Have a general formula for making spirits, omit spirit of anise, juniper, juniper compound and lavender. (E. G. Eberle.)

Tincture of Iodine.—The amount of potassium iodide in tincture of iodine ought to be reduced. (E. G. Eberle.)

FLUIDEXTRACTS.

As therapeutic agents, I believe that their importance has been somewhat exaggerated and I would not recommend an increase in their number. Their use is, I believe, a matter of education, and with but few exceptions I believe that the more easily prepared tinctures will answer all requirements. So far as the Pharmacopœia is concerned, I believe that the details of their preparation can be compassed in a few type processes with great saving of space. I would not favor their preparation by a process based upon incomplete exhaustion of the drug in instances where no standardization is required. I believe that the use of glycerin and acetic acid, etc., should be further investigated with a view to ascertain if after all it is really desirable. I believe that if repercolation is recommended as an alternative process, it should be defined. There are several methods of repercolation in use, and I do not believe that the results obtained by these different processes will be concordant. Specific instances where its use is desirable should be pointed out. I have found that different lots of senega differ considerably in their tendency towards gelatinization and I have not noted that the present process is any improvement on the former one. I do not know why solution of soda is used in preparing fluidextract of dandelion, unless it is to make sodium salts of its resinous constituents, and I question the advisability of this. I believe that this fluidextract should be made with strong alcohol. (L. W. Havenhill.)

MODIFICATION OF THE OFFICIAL PROCESS.

The instability of fluidextracts is largely due to the extractive in the final exhaustion and the changes that it undergoes in evaporation. A modification that I have tried with aconite and a few assayable drugs is to percolate slowly only 850 Cc. for each 1000 Gm. of drug and take this as the finished product. This was assayed and found to be active and to keep well. If this suggestion is worthy of trial, then in practice the drug might be increased to 1200 Gm. and the percolation carried only to 1000 Cc. (G. M. Beringer.)

FLUIDEXTRACTS THAT ARE GOING INTO DISUSE.

The following are with us scarcely if ever used: lupulin, matico, savin, scopola (never used), staphisagria (tincture only used and strong enough for the purpose), coca, and their dismissal is warranted unless more frequently used elsewhere. (G. M. Beringer.)

Fluidextract of Buchu.—The menstruum should be alcohol. (G. M. Beringer.)

Fluidextract of Cinchona.—To insure the extraction of the drug a small quantity of hydrochloric acid should be added to the menstruum. (G. M. Beringer.)

Fluidextract of Nux Vomica.—My experiments convince me that acetic acid extracts a great deal of gelatinous extractive that is objectionable. (G. M. Beringer.)

Fluidextract of Red Rose.—A small percentage of sulphuric acid should be added to the menstruum to extract the coloring. (G. M. Beringer.)

Fluidextract of Senega.—I have not been satisfied with this made by the U. S. P. formula. It deposits a gelatinous sediment. (G. M. Beringer.)

Fluidextract of Senna.—Is the preliminary treatment with alcohol necessary, or is it

generally followed by the manufacturers? It is extremely wasteful of alcohol, adding very materially to cost. (G. M. Beringer.)

TINCTURES.

Tinctures.—Commenting upon the tinctures, I question the desirability of a uniform 10 per cent. strength. I see no reason for unnecessarily increasing their dose, as this would do. If we are to seek uniformity in the tinctures, why not base this upon the dose? I am not prepared to say that tincture of iodine from the standpoint of efficiency has been improved. It is, however, unquestionably more permanent than the former tincture. (L. W. Havenhill.)

Tinctures from Fluidextracts.—While this may be permissible in a few cases, the great danger is in the *abuse*. I have reason to know that there are quite a number of druggists and physicians who carry this easy process to the extreme and make such preparations as paregoric, tincture of benzoin and the compound tincture of benzoin from fluidextract, and even fluidextract of asafetida (so called) is sold for the purpose of making tincture and milk therefrom. On several occasions I have been enabled to compare such with U. S. P. preparations and the difference was very marked. Personally I believe that we should in every way possible provide that preparations be made direct from the drug and that much of the present slipshod, lazy work that is so detrimental to the standing of the profession is due to the neglect of this fundamental principle of the pharmacists' calling. (G. M. Beringer.)

Tincture of Belladonna.—Always made from the leaf; omit "Foliorum" in title. (G. M. Beringer.)

Tinctures of Benzoin and Benzoïn Comp.—Directions to triturate not practical. Why should this be done in benzoin and not in tincture aloes, etc.? Maceration in suitable container with frequent agitation is sufficient in this as in others. (G. M. Beringer.)

Tincture of Gambir, Comp.—The change to gambir has not proven satisfactory and with us tr. catechu comp. is usually specified possibly also because that was just double the strength of the present official. Why the change here to 5 per cent. tincture? (G. M. Beringer.)

Tincture of Lactucarium.—See paper on syrups where this is taken up. If my views on this are adopted there will be no need for the tincture. (G. M. Beringer.)

Tincture of Nux Vomica.—I have tried to make this from a number of the extracts on the market and the results have been all colors and appearances and all precipitated, some very much more than others. For several years now, I have been preparing this direct from the drug, using as a menstruum alcohol 3 water 1. The result has been eminently satisfactory, assaying fully up to the U. S. P. requirements and, on some lots using 10 per cent. of drug, actually above, and kept without any precipitation. In order to be assured of the strength of this tincture even when made from an assayed solid extract the U. S. P. directs assay of the product. I believe that the best tincture is one made direct from the drug. (G. M. Beringer.)

Tincture of Opium.—I believe that the present official method will yield a satisfactory preparation. The time is fully at hand when under the existing conditions the pharmacist must be prepared to assay his own preparations and as tincture of opium keeps fairly well it can be made in sufficient quantity to warrant assay without materially adding to the cost. (G. M. Beringer.)

Tincture of Vanilla.—Here the directions are not plain, and need re-writing to clarify. Instead of "reserved" liquid which might be construed as either the portion of menstruum not used in the maceration or the liquid used and strained off, should say the "strained liquid" and then later on in place of "sufficient menstruum" the balance of the prepared menstruum and then continue percolation with a mixture of alcohol and water of the same proportion until 1000 Cc. is obtained. This example well illustrates

the advantage of a simpler method of specifying alcoholic menstrooms as a simple statement that alcohol 160 per cent. was to be used would suffice. (G. M. Beringer.)

Tincture of Quillaja.—If diluted alcohol will extract this for fluidextract then why does the U. S. P. direct the tincture to be made by decoction? 800 Cc. of boiling water will not extract 100 Gm. of quillaja nor will the subsequent displacement with the amount directed suffice. If percolation with hydro-alcoholic menstroom will extract for fluidextract then is it not also probable that the same menstroom would be preferable for the tincture? This is easily demonstrated by experiment. (G. M. Beringer.)

Tincture of Veratrum.—I doubt the advisability for uniform 10 per cent. drug strength for all tinctures. My experience is that this pharmacopœial experiment has destroyed the confidence of our local physicians in at least one very important tincture, namely, that of veratrum viride. I note a very decided increase in the demand for a certain proprietary tincture and several of my medical friends in answer to my queries have said that their use for this was in eclampsia and that they failed to get results with the official tincture. This may be due to their neglecting to quadruple the dose of the official to correspond to that of the previous revision. But if they do so, then they will have to contend with the increased alcohol counteracting the action of the drug. This leads to a suggestion that there be introduced a concentrated tincture of veratrum viride made 50 per cent. drug strength. (G. M. Beringer.)

Tinctures.—The sub-committee has not found time to answer to its own satisfaction, many of the questions that have occurred to it. The feeling of the members, however, is that the processes should be simplified, that space in the U. S. P. be economized, that the strength of the alcohol used in their preparation be reduced to a minimum, and that the number of processes and multiplicity of details be reduced to the lowest limit. While they recognize that a great deal of time and energy has been expended in evolving the present processes, still there is the firm belief that the expenditure of more time and energy, perhaps of a more concerted type will result in many improvements. It is recommended that a definite strength of alcohol be used in preparing the tinctures instead of the extemporaneous dilutions now in use. The committee has not yet had time to prove to its own satisfaction that the changes contemplated in the formulas will prove satisfactory, yet for the purpose of suggesting ground for co-operative work and if possible eliciting discussion, the following is outlined. In finally deciding upon the merits of any process the consideration should be first to have the tincture possess the therapeutic activity of the drug in a permanent form, and second to so modify the working details of the process as to require the minimum of attention from the operator and a minimum of space in the U. S. P. The following is suggested for consideration and revision:

Process A. Percolation, as directed in these formulas consists in subjecting a drug or mixture of drugs, in powder, contained in a vessel called a percolator, to the solvent action of successive portions of a menstroom in such a manner that as it traverses the powder in its descent to the receiver it shall become charged with the soluble portion of the drug and pass from the percolator free from insoluble matter.

When the process is successfully conducted, the first portion of the percolate will be practically saturated with the soluble constituents of the drug. If the quantity of menstroom is sufficient to exhaust the drug, the last portion of the percolate should be nearly free from color, odor, and taste, other than that of the menstroom itself.

Percolators.—The shape and size of the percolator should be adapted to the nature and quantity of the drug operated upon. The percolator most suitable for the quantities contemplated in these formulas should be nearly cylindrical or slightly conical and contracted into a narrow neck at the smaller end. This neck should be rather short and expanded at its orifice so that a cork may be tightly wedged into it. The larger end of the percolator should be ground so that it may be tightly covered with a ground glass

plate. A cylindrical percolator is preferred for drugs which do not swell appreciably and when the menstruum is strongly alcoholic or when ether or some volatile liquid is used for the extraction. If the conditions are greatly different from these, a conical percolator (funnel) may be used.

Percolators are best constructed of glass but unless otherwise directed they may be made of any material which is not affected by the drug or menstruum. The size of the percolator should be such that after the drug has been properly packed there will be a space of about 7 Cm. between its surface and the top of the percolator.

Preparation of the Percolator.—Into the neck of the percolator should be fitted a perforated cork bearing a short glass tube. This glass tube, which must not project above the inner surface of the cork, should extend from 2 to 3 Cm. beyond its outer surface and be provided with a closely fitting rubber tube, at least one-fourth longer than the percolator itself. This rubber tube ends in another short glass tube, preferably bent in the form of a hook, whereby it may be suspended so that its orifice shall be above the surface of the menstruum in the percolator. A small tuft of absorbent cotton is pressed into the neck and shoulder of the percolator, to serve as a filtering medium. A few drops of menstruum poured upon the cotton will facilitate the passing through it of the first portion of the percolate which is often very dense.

Preparation of the Drug.—The drug to be percolated should be of the fineness directed in the formula, and perfectly air-dried, when weighed. The required quantity is put into a basin, the menstruum poured on and the mixture stirred thoroughly with a spatula. The quantity of menstruum required for this purpose will vary with the nature of the drug. It should be sufficient to cause the drug particles to adhere when pressed firmly in the hand. The quantities specified in the formula will usually be sufficient. If the moistened powder is lumpy, it should be passed through a coarse sieve. No. 30 powders and those which are finer, require a No. 20 sieve. Coarser powders usually do not require this additional treatment after moistening.

The Process.—The powder is transferred to a sheet of thick paper and the whole quantity poured from this into the percolator, shaken down evenly, and packed firmly, unless otherwise specified, with a plunger of suitable dimensions. The pressure used should be governed by the character of the powdered drug and the alcoholic strength of the menstruum. Strongly alcoholic menstruum as a rule permits a firmer packing of the powder than the weaker. The percolator is placed in position for percolation, and the rubber tube having been fastened at a suitable height, the surface of the powder is covered with an accurately fitting disc of filter paper, held in place with a percolator weight or a little clean sand. Sufficient menstruum is now poured on through a funnel, reaching nearly to the surface of the paper to saturate the powder and leave a stratum above it. If these conditions are accurately observed, the menstruum will penetrate the powder equally until it has passed into the rubber tube and has reached in this a height corresponding to its level in the percolator. The percolator is closely covered to prevent evaporation and allowed to stand at rest for twelve hours, in the case of tinctures and 48 hours in the case of fluidextracts. To begin percolation, lower the rubber tube, with its glass end hooked into the neck of a bottle marked for the quantity of percolate to be received. By raising or lowering this receiver the rate of percolation may be increased or decreased as desired.

The Rate of Percolation.—For tinctures it should be from 8 to 15 drops per minute, and for fluidextracts, from 2 to 5 drops per minute.

A layer of menstruum must be maintained above the powder, so as to prevent the access of air to its interstices, until all has been added or the required quantity of percolate has been obtained. The menstruum may be added automatically by inverting a bottle containing the entire quantity over the percolator in such a manner that its mouth may dip below the surface of the liquid. The bottle should be of such shape that its shoulder

will serve as a cover for the percolator. The entire quantity of percolate should be obtained and thoroughly mixed before any of it is dispensed.

Maceration with Percolation. Process B.—This process is adapted to the extraction of drugs in which the solution of the active principles takes place slowly or where the saturated menstruum would be too viscid to permeate the successive layers of drugs in the percolator.

Process.—Introduce the drug of the fineness directed into a bottle and pour over it the volume of menstruum specified in the formula, unless otherwise directed. Cork tightly and macerate for seven days. During the maceration the bottle should be shaken at least three times a day.

When the period of maceration has been completed, transfer the contents of the bottle as completely as possible to a percolator which has previously been prepared in accordance with the directions given under percolators, Process A. (The rubber tube for controlling the rate of percolation may usually be omitted.) Allow the liquid to drain off as rapidly as possible, collecting it in a graduated bottle. If necessary some of the first percolate may be used to transfer the last portions of the drug from the maceration bottle. When the liquid has drained completely from the insoluble matter in percolator, pack gently, if the nature of the insoluble matter will permit of it, and add through it, first the rinsings of the maceration bottle and lastly enough fresh menstruum to produce the required volume of percolate.

Process A.—Modified for the use of glycerin, acetic acid, etc. This modification consists in mixing the supplementary solvent glycerin or acid with 100 Cc. of menstrum. The specified quantity of this mixture is used in percolator. When this mixture has passed below the surface of the drug, continue the process from this point in the regular way.

Process B.—Modified for the use of glycerin, acetic acid, etc. This modification consists in macerating the drug in the supplementary solvent glycerin or acid diluted with sufficient menstruum to make the volume specified. After the maceration the process is completed in the regular way.

Tinctura Aconiti, Tincture of Aconite.

Aconite, in No. 60 powder	100 Gm.
Alcohol, 70 per cent., a sufficient quantity to make	1000 Cc.
Process A. Moisten with	40 Cc.
Tincture of Aconite should assay by the official process 0.045	
Gm. of aconitine in each	100 Cc.

Tinctura Aloes, Tincture of Aloes.

Aloes, in No. 40 powder	100 Gm.
Glycyrrhiza, in No. 40 powder	200 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Pack gently.	

Tinctura Aloes et Myrrha, Tincture of Aloes and Myrrh.

Aloes, in No. 40 powder	100 Gm.
Myrrh, in No. 40 powder	100 Gm.
Glycyrrhiza, in No. 40 powder	100 Gm.
Alcohol, 70 per cent., a sufficient quantity to make	100 Cc.
Process A. Pack gently.	

Tinctura Arnica, Tincture of Arnica.

Arnica, in No. 20 powder	200 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 100 Cc. Pack very firmly.	

Tinctura Asafetida, Tincture of Asafetida.

Asafetida, well bruised.

Alcohol, a sufficient quantity to make..... 1000 Cc.

Process B. Macerate with 800 Cc.

Tinctura Aurantii Amari, Tincture of Bitter Orange Peel.

Bitter Orange Peel, in No. 40 powder..... 200 Gm.

Diluted alcohol, sufficient quantity to make 1000 Cc.

Process A. Moisten with 40 Cc.

Tinctura Aurantii Dulcis, Tincture of Sweet Orange Peel.Sweet orange peel, from the fresh fruit in thin shavings and cut
into narrow shreds..... 500 Gm.

Alcohol, a sufficient quantity to make 1000 Cc.

Process B. Macerate with 900 Cc.

Tinctura Belladonna Foliorum, Tincture of Belladonna Leaves.

Belladonna leaves, in No. 60 powder..... 100 Gm.

Diluted alcohol, a sufficient quantity to make 1000 Cc.

Process A. Moisten with 40 Cc.

Tincture of Belladonna should assay by the official process 0.03

Gm. of belladonna alkaloids in each 100 Cc.

Tinctura Benzoini, Tincture of Benzoin.

Benzoin, in small pieces..... 200 Gm.

Alcohol, a sufficient quantity to make..... 1000 Cc.

Process B. Macerate with 800 Cc.

Tinctura Benzoini Composita, Compound Tincture of Benzoin.

Benzoin, in small pieces..... 100 Gm.

Aloes, in small pieces..... 20 Gm.

Storax 80 Gm.

Balsam of tolu 40 Gm.

Alcohol, a sufficient quantity to make..... 1000 Cc.

Process B. Macerate with 800 Cc.

Tinctura Calendula, Tincture of Calendula.

Calendula, in No. 20 powder..... 200 Gm.

Alcohol, a sufficient quantity to make..... 1000 Cc.

Process A. Moisten with 80 Cc. Pack very firmly.

Tinctura Calumba, Tincture of Calumba.

Calumba, in No. 40 powder 200 Gm.

Diluted alcohol, a sufficient quantity to make 1000 Cc.

Process A. Moisten with 100 Cc. Pack moderately.

Tinctura Cannabis Indica, Tincture of Indian Cannabis.

Indian Cannabis, in No. 40 powder..... 100 Gm.

Alcohol, a sufficient quantity to make..... 1000 Cc.

Process A. Moisten with 50 Cc. Pack very firmly.

Tinctura Cantharidis, Tincture of Cantharides.

Cantharides, in No. 60 powder..... 100 Gm.

Alcohol, a sufficient quantity to make 1000 Cc.

Process A. Moisten with 35 Cc. Pack very firmly.

Tinctura Capsici, Tincture of Capsicum.

Capsicum, in No. 40 powder 100 Gm.
 Alcohol, 70 per cent., a sufficient quantity to make 1000 Cc.
 Process A. Moisten with 35 Cc.

Tinctura Cardamomi, Tincture of Cardamom.

Cardamom, in No. 40 powder 200 Gm.
 Diluted alcohol, a sufficient quantity to make 1000 Cc.
 Process A. Moisten with 80 Cc.

Tinctura Cinnamomi, Tincture of Cinnamon.

Saigon cinnamon, in No. 40 powder 200 Gm.
 Glycerin 75 Cc.
 Alcohol, 70 per cent, a sufficient quantity to make 1000 Cc.
 Process A. Modified. Moisten with 80 Cc.

Tinctura Colchici Seminis, Tincture of Colchicum Seed.

Colchicum Seed, in No. 40 powder 100 Gm.
 Diluted alcohol, a sufficient quantity to make 1000 Cc.
 Process A. Moisten with 40 Cc.
 Tincture of Colchicum Seed should assay by the official process
 0.04 Gm. of colchicine in each 100 Cc.

Tinctura Digitalis, Tincture of Digitalis.

Digitalis, in No. 60 powder 100 Gm.
 Diluted alcohol, a sufficient quantity to make 1000 Cc.
 Process A. Moisten with 40 Cc.

Tinctura Ferri Chloridi, Tincture of Ferric Chloride.

Solution of ferric chloride 350 Cc.
 Alcohol, a sufficient quantity to make 1000 Cc.

Mix them. Allow the tincture to age in a closely covered vessel protected from the light, for three months; then transfer it to a glass stoppered bottle, and keep in a cool place. Tincture of ferric chloride should assay by the official process 13.30 Gm. of anhydrous ferric chloride in each 100 Cc. Tests and description to follow if desirable.

Tinctura Galla, Tincture of Nutgall.

Nutmall, in No. 40 powder 200 Gm.
 Glycerin 100 Cc.
 Alcohol, a sufficient quantity to make 1000 Cc.
 Process A. Modified. Shake down the powder evenly and compactly, but do not moisten or pack it.

Tinctura Gambir Composita, Compound Tincture of Gambir.

Gambir, in small fragments 200 Gm.
 Saigon cinnamon, No. 40 powder 25 Gm.
 Diluted alcohol, a sufficient quantity to make 1000 Cc.
 Process B. Macerate with 800 Cc.

Tinctura Gelsemii, Tincture of Gelsemium.

Gelsemium, in No. 60 powder 100 Gm.
 Alcohol, 70 per cent., a sufficient quantity to make 1000 Cc.
 Process A. Moisten with 35 Cc.
 Tincture of Gelsemium should assay by the official process —
 Gm. of gelsemium alkaloids in each 100 Cc.

Tinctura Gentianæ Composita, Compound Tincture of Gentian.

Gentian, in No. 40 powder	100 Gm.
Bitter orange peel, in No. 40 powder	40 Gm.
Cardamom, in No. 40 powder	10 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 60 Cc. Pack moderately.	

Tinctura Guaiaci Ammoniata, Ammoniated Tincture of Guaiac.

Guaiac, in small pieces	200 Gm.
Aromatic spirit of ammonia, a sufficient quantity to make	1000 Cc.
Process B. Macerate with 800 Cc.	

Tinctura Guaiaci, Tincture of Guaiac.

Guaiac, in small pieces	200 Gm.
Alcohol, a sufficient quantity to make	1000 Cc.
Process B. Macerate with 800 Cc.	

Tinctura Hydrastis, Tincture of Hydrastis.

Hydrastis, in No. 60 powder	200 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 60 Cc.	
Tincture of Hydrastis should assay by the official process 0.4 Gm. of hydrastine in each 100 Cc.	

Tinctura Hyoscyami, Tincture of Hyoscyamus.

Hyoscyamus, in No. 60 powder	100 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 40 Cc.	
Tincture of Hyoscyamus should assay by the official process 0.007 Gm. of the alkaloids of hyoscyamus in each 100 Cc.	

Tinctura Iodi, Tincture of Iodine.

Iodine	70 Gm.
Potassium iodide, in fine powder	50 Gm.
Alcohol, a sufficient quantity to make	1000 Cc.
Dissolve the iodine and potassium iodide in the alcohol by circulatory displacement. Tincture of Iodine should assay by the official process 6.86 Gm. of Iodine in each 100 Cc.	

Tinctura Ipecacuanhæ et Opii, Tincture of Ipecac and Opium.

Tincture of deodorized opium, 1000 Cc. reduced by evaporation in a tared dish on a water bath to	800 Gm.
Fluidextract of ipecac	100 Cc.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Mix thoroughly. Filter after 12 hours, washing the filter with sufficient menstruum.	

Tinctura Kino, Tincture of Kino.

Kino, in coarse powder	50 Gm.
Glycerin	150 Cc.
Water	150 Cc.
Alcohol	700 Cc.
Alcohol, 7 per cent., a sufficient quantity to make	1000 Cc.

Add the kino to the mixture of glycerin, and water in a flask and heat in a bath of

boiling water with frequent agitation for one hour. Cool to 40° C., replace the water lost by evaporation. Add the alcohol, and finish by process B. Macerate for 24 hours. Preserve the mixture in small well filled bottles.

Tinctura Krameria, Tincture of Krameria.

Krameria, in No. 40 powder.....	200 Gm.
Diluted alcohol, a sufficient quantity to make.....	1000 Cc.
Process A. Moisten with 80 Cc.	

Tinctura Lactucarii, Tincture of Lactucarium.

I have been unable to manipulate this formula with any degree of satisfaction. As this tincture is used in preparing the syrup, I hope that some better process can be devised for the latter.

Tinctura Lavandulae Composita, Compound Tincture of Lavender.

Oil of lavender flowers	8 Cc.
Oil of rosemary.....	2 Cc.
Saigon Cinnamon, in No. 40 powder	20 Gm.
Cloves, bruised	5 Gm.
Myristica, bruised.....	10 Gm.
Red Saunders, No. 60 powder.....	10 Gm.
Alcohol, 70 per cent., a sufficient quantity to make	1000 Cc.
Process B. Macerate with 900 Cc.	

Tinctura Limonis Corticis, Tincture of Lemon Peel.

Lemon peel, from the fresh fruit, in thin shavings and cut into narrow shreds	500 Gm.
Alcohol, a sufficient quantity to make.....	1000 Cc.
Process B. Macerate with 900 Cc.	

Tinctura Lobelia, Tincture of Lobelia.

Lobelia, in No. 50 powder.....	100 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 50 Cc.	

Tinctura Moschi, Tincture of Musk.

Musk	5 Gm.
Alcohol	45 Cc.
Water.....	45 Cc.
Diluted alcohol, a sufficient quantity to make	100 Cc.

Triturate the musk with the water added a little at a time, until a smooth mixture is obtained; transfer the mixture to a bottle, add the alcohol, and finish by Process B.

Tinctura Myrrha, Tincture of Myrrh.

Myrrh, in small pieces.....	200 Gm.
Alcohol, a sufficient quantity to make	100 Cc.
Process B. Macerate with 800 Cc.	

Tinctura Nucis Vomica, Tincture of Nux Vomica.

Several tinctures of nux vomica have recently come to my notice which had a pronounced odor of ethyl acetate. Does this tincture develop this odor when made from the extract, or only when made from the fluidextract, what is the explanation of it? Extract of nux vomica is very hygroscopic and I think unsuited in several ways for the preparation of the tincture.

Tinctura Opii, Tincture of Opium.

Granulated opium	100 Cc.
Alcohol	500 Cc.
Diluted alcohol and water, of each a sufficient quantity to make 1000 Cc.	

Heat 500 Cc. of water to boiling and pour on the granulated opium and stir thoroughly, occasionally, until the mixture becomes cold. Strain through muslin expressing the residue; reserve this infusion. Repeat the extraction with portions of 250 Cc. of water until the opium is exhausted. Evaporate the second and succeeding portions of infusion on a water-bath to a soft extract. Dissolve this extract in the reserved infusion and transfer to a calibrated bottle, adding the alcohol. Dilute to 1000 Cc. with water. Mix thoroughly and allow to stand over night. Decant through a filter and wash the bottle and filter with enough diluted alcohol to make the filtrate measure 1000 Cc.

Alternate Process.

Extract of opium	62.5 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.

Tincture of Opium should assay by the official process from 1.20 to 1.25 Gm. of crystallized morphine in each 100 Cc.

Tinctura Opii Camphorata, Camphorated Tincture of Opium.

Powdered opium	4 Gm.
Benzoic acid	4 Gm.
Camphor	4 Gm.
Oil of anise	4 Cc.
Glycerin	40 Cc.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process B. Macerate with 900 Cc.	

Tinctura Opii Deodorati, Tincture of Deodorized Opium.

Granulated opium	100 Gm.
Ether.....	200 Cc.
Alcohol	200 Cc.
Water, a sufficient quantity to make	1000 Cc.

Process U. S. P. VIII. Deodorize with two portions of ether. Tincture of deodorized opium should assay by the official process 1.25 Gm. of crystallized morphine in each 100 Cc.

Tinctura Physostigmatis, Tincture of Physostigma.

Physostigma, in No. 60 powder	100 Gm.
Alcohol, a sufficient quantity to make.....	1000 Cc.

Process A. Moisten with 40 Cc. Tincture of physostigma should assay by the official process 0.014 Gm. of physostigma alkaloids in each 100 Cc.

Tinctura Pyrethri, Tincture of Pyrethrum.

Pyrethrum, in No. 60 powder	200 Gm.
Alcohol, a sufficient quantity to make.....	1000 Cc.
Process A. Moisten with 80 Cc.	

Tinctura Quassia, Tincture of Quassia.

Quassia, in No. 40 powder	200 Gm.
Alcohol, 35 per cent., a sufficient quantity to make.....	1000 Cc.
Process A. Moisten with 60 Cc.	

Tinctura Quillaja, Tincture of Quillaja.

Quillaja in No. 40 powder	200 Gm.
Alcohol, 35 per cent., a sufficient quantity to make.....	1000 Cc.
Process A. Moisten with 80 Cc.	

Tinctura Rhei, Tincture of Rhubarb.

Rhubarb, in No. 40 powder	200 Gm.
Cardamon, in No. 40 powder.....	40 Gm.
Glycerin.....	100 Cc.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Modified. Moisten with 90 Cc. Pack moderately.	

Tinctura Rhei Aromatica, Aromatic Tincture of Rhubarb.

Rhubarb, in No. 40 powder	200 Gm.
Saigon cinnamon, in No. 40 powder.....	40 Gm.
Cloves, bruised.....	40 Gm.
Myristica, bruised.....	20 Gm.
Glycerin.....	100 Cc.
Diluted Alcohol, a sufficient quantity to make.....	1000 Cc.
Process A. Modified. Moisten with 90 Cc. Pack moderately.	

Tinctura Sanguinaria, Tincture of Sanguinaria.

Sanguinaria, in No. 60 powder... ..	100 Gm.
Acetic acid	20 Cc.
Diluted alcohol, a sufficient quantity to make.....	1000 Cc.
Process A. Modified. Moisten with 30 Cc.	

Tinctura Scilla, Tincture of Squill.

Squill, in No. 20 powder	100 Gm.
Alcohol, 70 per cent., a sufficient quantity to make	1000 Cc.
Process B.	

Tinctura Serpentaria, Tincture of Serpentaria.

Serpentaria, in No. 40 powder	200 Gm.
Alcohol, 70 per cent., a sufficient quantity to make	1000 Cc.
Process A. Moisten with 60 Cc.	

Tincture Stramonii, Tincture of Stramonium.

Stramonium, in No. 60 powder.....	100 Gm.
Diluted alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 40 Cc.	

Tincture of Stramonium should assay by the official process 0.025 Gm. of stramonium alkaloids in each 100 Cc.

Tinctura Strophanthi, Tincture of Strophanthus.

Strophanthus, in No. 60 powder	100 Gm.
Alcohol, a sufficient quantity to make	1000 Cc.
Process A. Moisten with 50 Cc.	
Process can probably be improved.	

Tinctura Tolutana, Tincture of Tolu.

Balsam of Tolu	200 Gm.
Alcohol, a sufficient quantity to make.....	1000 Cc.
Process B. Macerate with 800 Cc.	

Tinctura Valeriana, Tincture of Valerian.

Valerian, in No. 60 powder	200 Gm.
Alcohol, 70 per cent., a sufficient quantity to make	1000 Cc.
Process A. Moisten with 60 Cc.	

Tinctura Valeriana Ammoniata, Ammoniated Tincture of Valerian.

Valerian, in No. 60 powder 200 Gm.
 Aromatic Spirit of Ammonia, a sufficient quantity to make.... 1000 Cc.
 Process A. Moisten with 60 Cc.

Tinctura Vanilla, Tincture of Vanilla.

Vanilla, cut into small pieces and bruised..... 100 Gm.
 Sand 100 Gm.
 Diluted alcohol, a sufficient quantity to make..... 1000 Cc.

Macerate the vanilla in 500 Cc. of diluted alcohol for 24 hours, then strain off the liquid, and beat the residue and the sand in a mortar to a uniform mass. Pack this mass in a percolator and proceed by process A, using as menstruum, first the strained liquid, and lastly diluted alcohol.

Tinctura Veratri, Tincture of Veratrum.

Veratrum, in No. 60 powder..... 100 Gm.
 Alcohol, a sufficient quantity to make..... 1000 Cc.
 Process A. Moisten with 40 Cc.

Tinctura Zingiberis, Tincture of Ginger.

Ginger, in No. 40 powder 200 Gm.
 Alcohol, a sufficient quantity to make..... 1000 Cc.
 Process A. Moisten with 60 Cc.

Tinctura Herbarum Recentium, Tinctures of Fresh Herbs.

It would seem desirable to have these of uniform strength, each 100 Cc. of tincture to contain the active principles of 10 Gm. of dry drug.

(L. W. HAVENHILL, *Chairman*).

FURTHER COMMENTS ON THE OFFICIAL SOLIDS FOR EXTERNAL USE.

Cataplasma Kaolini is all right when freshly made as called for. It is then not necessary to heat the kaolin.

Cera Flava and *Cera Alba* are both satisfactory.

Cerates.—Camphor, cantharides and the subacetate of lead cerates made according to the formulas of the 1880 Pharm. are better products than those of the last two revisions. The old and tested formulas of the two resin cerates are good.

Benzoinated Lard.—Made by the formula of 1880 is a more cleanly process than that of the present pharmacopœia and just as good.

Adeps Lana Hydrosus.—Should be dropped, the information that adeps lanæ has the property of being miscible with water, set out under its description.

Cetaceum is all right.

Mustard Plaster.—The spreading and preparation of mustard plaster is an art of the past and may as well be dismissed (the formula I mean).

Oleates.—Are easily made, and should be retained.

Ointments.—As a class need careful revision. The substitution of white wax for the yellow in recent revisions is a mistake. Ungentum of the present pharmacopœia is much inferior to that of 1880. The only apparent excuse for this change being a change of color from yellow to white.

Ointments of boric acid, Diachylon, nutgall, nitrate of mercury, iodoform, tar, sulphur and zinc oxide, are all right providing they are made up fresh when dispensed.

Rose water ointment formula is good, and ought not be changed.

The use of glycerin in tannic acid and the iodine ointments is not necessary and should be omitted.

The omission of benzoated lard from the formulas for belladonna and stramonium ointments would be an improvement.

In the formula for chrysarobin ointment there seems to be a typographical error, 6 Gms. chrysarobin being ordered instead of 5.

To the formula for mercurial ointment add some wool fat. This will expedite the division of the mercury.

Leave out petrolatum from the white precipitate ointment, and use just enough water to thoroughly rub out the white precipitate. Mixed then with wool fat we get a very smooth and nice preparation.

The dilute blue ointment made with lard or benzoated lard is superior to that made with petrolatum.

Don't see the wisdom of having both oxide of mercury ointments official. That of the red if properly made, becomes the yellow anyway, Cheapness of one chemical over that of the other has been stated, should not receive consideration, which quality of the finished product might be, under careless manipulation, so very inferior.

Ointment of phenol made up with the old yellow wax simple ointment of 1880, is far superior to that made up with petrolatum.

Ointment of zinc stearate made with benzoated lard will be quite an improvement on the present formula. (Wm. Mittelbach.)

CHARLES E. CASPARI,
A. B. LYONS,
EDGER L. PATCH,
C. S. N. HALLBERG,
L. F. KEBLER,
GEORGE M. BERINGER, *Chairman*.

The Chair expressed the hope that, in the discussion on the scope of the Pharmacopœia, the members would confine themselves to the principle, and not dwell on the individual article, because to do the latter would mean that the Section would have to stay in session all the week. He thought there was ample to say in regard to the principle, without attempting to deal with the individual article.

Mr. Francis said he would like to ask as a matter of information whether this very valuable work in the form suggested was liable to be brought officially or otherwise before the delegates who were to gather at Washington City, and who would very largely decide the policy which would control in the revision of the United States Pharmacopœia. He said he asked this because he really did not know whether it could be brought before the attention of this assembled body—whether that would be possible. But inasmuch as the policy of revision would be largely decided on broad lines, it might serve some very valuable purpose if the wisdom of this body in some form of expression could be brought to the consideration of the delegates there assembled.

The Chair said that this would be an official message from the American Pharmaceutical Association to the Pharmacopœial Convention. The Pharmaceutical Association, as one of the members of the Pharmacopœial Convention, was expected to present to that Convention an official report, suggesting the lines along which the Pharmacopœia should be revised—

suggesting principles, and suggesting in detail the necessary changes that should be made. It was for this reason that this report this afternoon was of such vital importance—"the most vital thing we will have before us at this session." The Chair said he trusted that the expression of opinion by the members would be sincere and to the point. He thought the Convention would be largely guided, in all probability, by the views of this Association; the Association in the past had yielded a great influence on the actions of the Pharmacopœial Convention, and probably would do so in the future.

Mr. Hallberg said he would like to have a definition of what constituted "recognition." If a considerable number of practicing physicians in various States used a medicine considerably for an extensive period, he would call that recognition. "Recognition" did not mean, as he saw it, that certain medical men regarded it as of value; that recognition meant that it was used by physicians in actual practice to a considerable extent. He believed the proposition could be accepted that the tabulated report which represented prescriptions from all sections of the United States gave a fair idea as to the use of these medicines. He said the committee of which he was a member had made summaries of the first 10,000 prescriptions from different localities, and they had made a summary again of about 40,000 prescriptions, and singularly enough the average was almost the same for the first 10,000 as it was for the total 117,000; the average seemed to hold good throughout. He said this collection represented 8,000 prescriptions from the New England States, 33,000 from the Eastern States, 40,000 from the Central States, 7,000 from the Southern, 11,000 from the Western, 7,000 from the Southwestern, 3,000 from the Mountain and 8,000 from the Pacific States. Mr. Hallberg gave it as his opinion that recognition meant medicines that were shown by this compilation to be used by general practitioners.

Mr. Stevens thought the fact that physicians prescribed a thing did not necessarily make it valuable. Some physicians prescribed a certain preparation once and did not use it again. This was notably so where some traveling man comes to a locality and gets a physician to prescribe a preparation once or twice, and he goes away and that is the end of it. Yet such prescriptions as these get into a compilation like that here presented. He said the thing to bear in mind was the use, not the recognition, of value. Things were put in the Pharmacopœia because there was a demand for them, and not that they were preparations of value. While pharmacists might desire certain things in the Pharmacopœia because there was a demand for them, they did not pretend to say they were valuable. Nothing in the Pharmacopœia had any guaranty of value.

Mr. Beringer suggested that item 2, title, "Function," of the committee's proposed list of general principles to be observed in the revision of the Pharmacopœia, covered this point.

Mr. Kraemer said this was a very important question. There was a movement on the part of the medical profession to determine what should be the additions and deletions in the Pharmacopœia. So far as he knew, the value of statistics of prescriptions had never been brought to the attention of the Committee of Revision, but would probably be brought to the attention of the Convention, and he quite sympathized with the statement made by Mr. Stevens. When a substance had a recognized value, he thought it should go into the Pharmacopœia, whether it was used or not. Whether the reverse of this was true he was not so clear. He expressed the hope that this discussion would continue for a little while, because it was very important to the interests of pharmacists, and when the Convention met in Washington City next week, it was a question of what interest they had in that work. The pharmacists of the country were vitally concerned in the Pharmacopœia, more so than even the medical profession, and he hoped there would be a full discussion on the value and importance of these statistics of prescriptions. He thought that the pharmacists ought to have a hand in saying what substances should be included in the Pharmacopœia and what deleted from it, and that it should not be left entirely in the hands of the medical profession.

Mr. Lyons thought there was danger of misapprehension and misunderstanding on a subject of this kind. He said he thought as he listened to the reading of the report that, on the one hand, there was a certain class of physicians that considered physiological action the only test of value—some demonstrable action; while on the other hand, the great rank and file of the medical profession expressed themselves in their prescriptions. Whether they had definite ideas or not, the prescriptions told what they expected would have a curative effect. He thought this was not the time to debate what would come a little later in the report—the question of the function of the Pharmacopœia, and he doubted the advisability of discussing this subject any further at this time.

The Chair called attention to the recent report of the Committee on Conference of the British Pharmacopœia, an interesting report on some 40,000 prescriptions, in which such a substance as digitalin appeared but three times whereas antikamnia appeared 670 times.

Mr. Hallberg said there had been so many “pronunciamentos” on the scope and function of the Pharmacopœia from a medical point of view, that he would like to take up three or four minutes time of the Section in reading a series of resolutions passed by the Chicago Academy of Medicine on the scope of the Pharmacopœia, which he thought contained some new features and new principles that had heretofore not been presented from any medical society:

CHICAGO, April 21, 1910.

WHEREAS Pharmacopœias have always been merely legal standards for the purity of drugs prescribed by physicians in legal practice of their profession and,

WHEREAS the first American Pharmacopœia, that of 1778 established by Dr. Tilton, Surgeon General of the Continental Army, was merely a check on drugs, sold by Contractors; and,

WHEREAS this principle is the only one which has determined, justified and secured the existence of pharmacopœias for centuries in the old world and the new; and,

WHEREAS any departure from this function in the education, uplift or other extra legal direction would destroy the Pharmacopœia in the courts as a legal standard, since the speculative element would dominate the product of centuries of evolution; and,

WHEREAS this principle of a legal standard of drugs prescribed must be based on statistical study of drugs actually prescribed; therefore, it is hereby

Resolved, By the Chicago Academy of Medicine that only such changes should be made in the Pharmacopœia as are adapted to secure its function as a legal standard;

Resolved, That all compounds now tested by decades of use should be retained in the Pharmacopœia and that no sectarian notions as to the use of single drugs should be permitted to control in any way the retention of drugs or compounds in the Pharmacopœia especially since upon methods of preparation depend therapeutic efficiency.

Resolved, Further, that no article should be dropped from the Pharmacopœia which statistical study of prescriptions shows to be still in use.

Resolved, That upon statistical study of prescriptions alone can a Pharmacopœia be based.

Resolved, Also that, since clinical studies of drugs show the existence of idiosyncrasies leading to untoward effects substitutes for drugs are needed in emergencies and that no drugs should be dropped because one drug seems to meet ordinary therapeutic indications.

Resolved, Further, that scientific principles, not parsimonious typography, should govern nomenclature and that dropping of the final *e* in chloride, etc., and in names of alkaloïds is misleading.

Resolved, That whereas the fanatic and the blackleg, the alcophobiæ and the liquor trust have for different reasons determined to destroy the pharmacopœic standard of wines and liquors, these in the interest of therapeutic efficiency must be retained, since tinctures will not replace them.

Resolved, That whereas the use of ordinary names leads to self-prescription, therapeutic distrust and drug habits, there should be an extended list of synonyms.

Resolved, That whereas dosage must be determined by emergencies and the state of the patient, no table of dosology should be given in the Pharmacopœia to serve as a source of malpractice suits.

The Chair asked if there was any further discussion on this question of the scope of the Pharmacopœia.

Mr. Wetterstroem said he would like to call the attention of the members to the condition of a class of preparations that had been hitherto prepared by a manufacturing house, largely. He referred to the tablet triturates. Heretofore, he said, pharmacists had not been called upon to make any of these, but lately prescriptions were being received of a character that indicated the physicians were not dispensing these tablet triturates as formerly, but were relying on the pharmacists to make them. At the present time some pharmacists were using as a base sugar of milk, others talcum powder, others kaolin, and still others calcium sulphate. He expressed the opinion that some general formula should be embodied

in the Pharmacopœia for a filler for tablet triturates, as the physicians using them did not really know what they were.

Mr. Wood, of Philadelphia, inquired what was to become of the particular section now under consideration ; that it seemed there was some difference of opinion as to what the precise wording should be. He wanted to know if the report was to be presented as it stood to the Convention. The Chair replied that, unless the committee was directed to change it, it would stand. Mr. Wood said in that case he would like to move that the phrase, that the committee was opposed to admitting drugs only of recognized medicinal value, be omitted. Mr. Puckner seconded this motion.

Mr. Beringer said he thought Mr. Wood had an erroneous impression of the wording of the report ; that the intent of the committee was to state that therapeutic action *alone* was not to be considered in deciding this question from a pharmaceutical standpoint—not the therapeutic activity of the drug as determined by pharmacological experimentation. He said he thought the language referred to was this : “Equally erroneous is the proposition that the Pharmacopœia shall comprise only drugs and remedies of recognized medicinal value, and that admission should be decided on the basis of established therapeutic activity.” He asked what modification of that language was desired.

Mr. Wood responded that his motion was, that the sentence be stricken out, because it seemed to him that, as Mr. Hallberg had stated, thousands of physicians used these things, and the assumption that they had no therapeutic value was a gratuitous insult to the medical profession.

Mr. Hallberg said he would like to ask Mr. Wood who composed the medical profession, the experimenters in research laboratories or the men who went out and battled with disease. In his opinion, the latter constituted the medical profession, not the laboratory workers.

The Chair suggested that this was not the point that Mr. Wood was making, which was, that this particular statement in the report insulted the very men that Mr. Hallberg was defending.

Thos. Stoddart, of Buffalo, N. Y., said he had listened to a number of prescriptions read from the different States, and he wanted to know how many of these prescriptions contained proprietary preparations unknown to the Pharmacopœia ; also, as to whether they were prescriptions which had been selected by the committee.

Mr. Hallberg replied that the prescriptions were taken, one thousand consecutively from the files, and without any discrimination. He said there were a great many proprietary preparations from some localities, but a much smaller number than would have appeared five years ago. The results had not been figured out completely as yet, because the compilation was made for the Trustees of the Pharmacopœia, and report would be made next week to the Trustees. The committee was not in a position to go into the details of all these matters as yet, though it had the statistics *en masse*.

Mr. Beringer said that, after hearing Mr. Wood define his position last week at another meeting, he thought they were not very far apart, and he would like for him to define his position now, and perhaps they could get together.

Mr. Wood said Mr. Hallberg entirely misunderstood him: that his position in this matter was, that as long as a large per cent. of the medical profession were using a drug, and they had used that drug over a considerable period of time, it was *prima facie* evidence that the drug was useful and should be admitted into the Pharmacopœia.

Mr. Lyons said he would like to offer a substitute to the Wood motion, as he thought if the language was modified there would be a clear understanding of exactly what was meant. Mr. Beringer had used the expression "remedies of recognized medicinal value," but that what he meant was activity—activity determined by pharmacological test.

Mr. Beringer said he thought if this language was changed to "remedies of tested pharmacological value" it would probably meet Mr. Wood's idea and his own; that he knew they agreed in this matter.

Mr. Wood said he would be glad to accept Mr. Lyons' substitute, and Mr. Beringer announced he had changed the words to that effect.

Mr. Beringer then read the next section of the report of the committee, dealing with the report of the Sub-committee on Review of Foreign Pharmacopœias.

Mr. Sondheimer, in regard to the non-compliance of the U. S. Pharmacopœia with the Brussels Protocol, endorsed the attitude of the U. S. P. as a whole, though some things, such as opium, for instance, needed revision. He thought 10 per cent. of morphine should certainly be adopted in that case. He was very much in favor of the recommendation as to a standard medicine dropper. As all know, the drop is not always a drop, and it would be very dangerous as regards arsenical preparations.

Mr. Lyons commented upon the variance of the Pharmacopœias of the world from the requirements of the Brussels Protocol, pointing out that the Mexican and Spanish Pharmacopœias most nearly approximate it, while the German and United States Pharmacopœias, especially the latter—which represented the greatest independence of thought along these lines, showed the widest variance from the recommendations of the Protocol. The object of the convention was to secure practical uniformity in the strength of important drugs, and in that respect the U. S. P. was the first to enter into the spirit of that idea and adopt the 10 per cent. basis for "potent" tinctures. He said allusion had been made to the difference in morphine strength between the U. S. P. standard and other standards, and called attention to the fact that important differences in the basis of morphine percentages had been ignored.

The international standard for tincture of opium is one per cent. by weight of anhydrous morphine. The U. S. P. standard is 1.2 to 1.25

grams of hydrated morphine (about 1.13 to 1.18 grams of anhydrous morphine) per 100 Cc. of tincture. The difference between the two standards is not nearly so considerable as it at first appears.

Mr. Lyons said there were so many subjects that were embraced in this part of the paper that he did not know how the Section could find time to intelligently discuss them all.

Mr. Hallberg, referring to the classification of the U. S. P. as amounting to only 20-odd per cent. of the requirements of the Protocol, asked if in that was included, as he gathered, that there should be a uniform 70 per cent. alcoholic menstruum for potent drugs. If this percentage rating was based on that idea, he thought it was certainly not fair, and the Chairman was not strong enough in his statement that the U. S. P. had only complied within 20 per cent. of the requirements of the Protocol. He said everybody knew better than to adopt a uniform menstruum of 70 per cent. alcohol for potent drugs. It was ridiculous. No man of experience would entertain such a thing for a moment. "What has the French Codex done?" said Mr. Hallberg. "We have, at the risk of what many thought was a most hazardous undertaking, changed the strength of the tincture of aconite from 35 to 10 per cent., and of tincture of veratrum viride from 40 to 10 per cent. That certainly was more than any other country has done to conform to this conference held as to potent remedies, and for no other purpose."

Mr. Beringer, said that, speaking of the French Codex, he thought that there was one thing that ought to be explained. The Codex contained in the official list a syrup of iodide of iron, and put after it *gallicus* and makes it only $\frac{1}{2}$ of 1 per cent.; and then, in order to conform to the Conference, it puts in an appendix the entire Protocol.

The Chair stated that the Codex also included in a footnote the information that, "This is not the International standard."

Mr. Francis said he wanted, if possible, to say something that might emphasize the objection of Mr. Hallberg to the adoption of any class "type process." He believed he was right in the statement that nowhere in the world had the study of liquid preparations reached the development that it had in the United States, and would dislike very much to see the Pharmacopœia take a backward step as a mere matter of expediency, governing the determination of menstrua and process for a preparation. Therefore, the idea governing in all such things should be, to adjust the menstruum after a study of the medicinal constituents of the drug; and also based upon the experience gained by years of preparing and dispensing such tinctures and fluidextracts. Mr. Francis said that there had been accumulated in the United States in the course of the last 35 years, in the manufacturing establishments and by the retail druggist, an enormous amount of practical experience of very great value. Turning to the question of the menstruum of these tinctures specifically, he said the

one criticism that he would offer to the tinctures of the U. S. P., 8th Revision, was that in the main they were somewhat deficient in alcoholic strength. He said he had had considerable experience in the preservation of such tinctures, the keeping and storing of them when made in accord with the last edition of the Pharmacopœia, and he ventured to say that he differed somewhat from the conclusions lately published by a prominent pharmacist to the effect that they were satisfactory. Nearly all of these would precipitate, even when kept under normal conditions: some were better, and some worse. He thought on the whole that a better menstruum would be produced if the alcohol was increased generally. This was especially true of tincture of strophanthus, and tincture of digitalis. The tincture of the latter contained 45 per cent., and the former 70 per cent. of alcohol. He thought in the determination of this matter in the future, pharmacists should be guided, as in the past, by a study of the particular drug under observation.

Mr. Beringer said he thought the statement of Mr. Francis was largely in the line of his own experience. Tincture of strophanthus was certainly a mistake. The results of reducing the alcoholic strength had not been satisfactory. In compound tincture of gentian, the increase of alcohol had not decreased the precipitation, but rather increased it. So he agreed with Mr. Francis that each individual drug should be considered.

Mr. Raubenheimer said he thought the extraction of the fixed oil from strophanthus by ether or petroleum benzin, was a direct violation of the Brussels Protocol. However the resulting deoleated tincture is much clearer and less nauseating.

The Chair suggested that it would also remove the active principle, but Mr. Beringer responded that petroleum benzin would not; that the amount of active principle extracted by this method was very slight—so slight that it could not be estimated.

Mr. Kraemer said that there was no question but that in this country pharmacists were a little wide awake since the passage of the Drugs Act, and he felt that the mistakes that had been made in the past would not be repeated. He referred to the symposium that would be held tomorrow on the pharmacopœias of the world, and said he was sure that there was not a pharmacist in the United States who would not be glad to be informed as to what other countries were doing. In the case of the Netherlands Pharmacopœia, of which he had been rather a close student, he said that the Protocol was incorporated into the Pharmacopœia some nine months before the Protocol was signed by the various countries represented. There was no question but that we cannot readily do all the things as arranged for by the Protocol. For instance, in the preparations of ipecacuanha the bark alone is used and separated from the wood. But, nevertheless, the main point that Mr. Beringer intended to bring out, he thought, was this; That we pledge due consideration to the Protocol, and that the

Revision Committee should, as far as practical, adopt these standards. He said that in the Netherlands Pharmacopœia each one of the international preparations had after its title the abbreviation "F. I." (Formula Internationale). Again, in that Pharmacopœia, under "cocaine," the international standards are given. He further suggested that he could not help but feel that the members of the U. S. P. convention were wide-awake, and would be perfectly willing to adopt these international standards as far as it was practicable.

Mr. Whelpley said that those who were familiar with pharmaceutical affairs, and particularly with pharmaceutical journalism, extending back 25 or 30 years, would remember the attention the Pharmaceutical Press gave to the subject of an International Pharmacopœia in the early eighties. At that time the pharmaceutical journals published page after page of formulas for the proposed International Pharmacopœia. Those who attended the American Pharmaceutical Meeting in 1892 and '93, would recall the time that was devoted to the discussion of an International Pharmacopœia and the approaching meeting of the Pharmaceutical Congress which was held in Chicago. He thought perhaps some of the members would remember the enthusiasm with which former Treasurer Shepard figured out that the Association could spare \$1,000 for the great and good cause of furthering the publication of an International Pharmacopœia. He saw the Pharmacopœia ready in the printer's hand. But the Congress met and adjourned, and the International Pharmacopœia was no nearer completion than it was the first time the International Pharmaceutical Congress met. Why? Because an effort was being made to give to all countries and agree to everything that country wanted in the Pharmacopœia. In some way, he didn't know exactly how—perhaps the Chairman could explain—pharmacists suddenly became extremely practical, and instead of trying to make an International Pharmacopœia, covering anything and everything that was described in any country, they conceived the idea of this Congress for the unification of potent remedies, in Brussels in 1902, which went to the other extreme, and which was called together principally with the view of agreeing upon uniform standards of strength for arsenical preparations and opium preparations. The other conditions contained in this Protocol were practically the outgrowth of the discussion on arsenic and opium. As the result of that Congress for the unification of potent remedies pharmacists were now working towards an International Pharmacopœia; but from exactly the other standpoint—from the standpoint of each one now vying with the other country in its effort to agree upon these general standards, where before each country was "standing pat," and asking of the other countries to adopt their standards. Now they had gone, as Mr. Hallberg had pointed out, to the great extreme of reducing the strength of such potent preparations as tincture of aconite, veratrum viride, and so on, thus showing

their willingness to get together on these things. Mr. Whelpley said he believed there was a lesson to be drawn here, and that a great result could be accomplished if this matter was gone about in the right way. "But we will work a long time if we do not approach the question from the right direction," said Mr. Whelpley. This discussion of the pharmacopœias of the world also had a high educational value. Mr. Whelpley said they had studied the pharmacopœias in school several years ago, and they had trouble with it, for the German and French professors preferred to work on some preparations that they knew in their pharmacopœias when they were students. But to-day, he said, they expect their students to understand a great deal about the principal pharmacopœias of the world. In other words, pharmacists were broadening their lines of work—their educational status; and at the same time were narrowing down to a common standard of agreement of strength and various other properties of the medicines that were to be used throughout the civilized world.

Mr. Motter said the general point was whether in this country we should to a still greater extent comply with the international standards for these drugs. He said there was one argument which occurred to him which had not been presented. He recalled the argument made by Dr. Horatio C. Wood before the Second International Sanitary Convention, which was published at Washington, when he advocated the translation of the U. S. P. into the Spanish language, looking to the possible preparation of a Pan-American Pharmacopœia. "Why should we have an international standard?" said Mr. Motter. If the Pharmacopœia is a book prepared for the convenience of the local medical or pharmaceutical professions, that is one thing. If, on the other hand, a pharmacopœia is published as a public-health measure—a book which necessarily affects the health of the people at large, and here came in Dr. Wood's argument—in these days of increased and growing transportation facilities, and the growing habit of travel, there is strength in the argument that different countries should adopt a uniform standard, especially for potent remedies, because of the interchange of prescriptions between civilized countries.

Mr. Lyons, upon the proposition of uniform menstruum, said that that subject was thoroughly thrashed out in the Revision Committee, and it was agreed that for each tincture that menstruum should be adopted which experience showed best suited to the drug.

The question of a standard dropper was discussed in all its bearings, and the consensus of opinion was that dosage by drops was not to be encouraged. If the dropper were adopted for use in measuring doses, it would be necessary to determine for each fluid preparation in the Pharmacopœia the number of standard drops to the fluidrachm—and the physician could not be expected to carry all these data in his memory, as he would be compelled to do in writing extemporaneous prescriptions.

Mr. Beringer stated that that part of the report he was about to read

now was, he thought, perhaps the one most important for the consideration of this Section: He then read the first three sections of the General Principles to be observed in the ninth revision of the U. S. Pharmacopœia.*

Mr. Raubenheimer made the comment on the last section read that what the pharmacist wanted to know, and what the physician wanted to know was what was safe for the public health. That was what all the foreign books had adopted, and it would be adopted here, too, sooner or later "after a number of people have been poisoned."

Mr. Stevens said that, of course, it was ~~absurd~~ to have a minimum dose in the Pharmacopœia, but certainly ~~there~~ should be a maximum dose. The Pharmacopœia now had an ~~average~~ dose, especially for potent drugs, so that the pharmacist could see what was a safe dose, and if the prescription went above that ~~he~~ would not dispense it without consulting the physician. The ~~statement~~ should also be made that the maximum dose was not to ~~control~~ the physician, as he might exceed it if he liked. It was ~~simply~~ to be a guide to the pharmacist.

Mr. Hallberg took the position that a maximum dose could not be fixed, because there was no such thing, and a standard could not be fixed for a thing that did not exist. What was a dose for one man was poison to another: one man might take 30 grains of salicylic acid, and would kill the next man. Doctor Prescott had said, "there were no more two human stomachs alike than there were two human faces," and he was right. Say the maximum dose for morphine sulphate, for instance, as given by the Pharmacopœia was one-third of a grain, and a prescription came in for morphine sulphate, one grain, what would the pharmacist do? If he called up the physician, the chances were that he would say that it was none of his business, and would instruct his patient to go to another pharmacist. Another practical and important point was the question of malpractice suits. There was not a month in the city of Chicago that there was not a malpractice suit instituted. A firm of lawyers in that city made a business of getting up such suits. He seriously objected to pharmacists deliberately laying themselves liable to such damage suits.

Mr. Lyons expressed the opinion that they had some good things in Europe after all. For instance, they had an idea there that the life and health of the community were of quite as much importance as the possibility of a damage suit against the druggist or a physician. He thought this was a good idea, and that we needed to have some standard here which would act as a guide to the pharmacist in these cases that occurred everywhere. He ventured to say there was not a pharmacist present who has not had to go to his physician to verify prescriptions. If the Pharmacopœia itself had a standard, the physician would be required to indicate

* See pages 535-546 incl.

on his prescription that he knew what he was doing when he exceeded a certain dose. There was no restriction now, and the physician forgot to indicate this, and the pharmacist ran the risk of a damage suit. He had always advocated some kind of a maximum single daily dose, like the European Pharmacopœias give. It was a sensible idea, and a protection alike to the physician, the patient and the pharmacist.

Mr. Stevens spoke for a maximum dose, and said he did not believe the average dose as it appeared in the Pharmacopœia was of any benefit to anybody. He thought it would have no effect on the question of damage suits, and many people wanted to know what was a safe dose.

Mr. Hallberg said that several gentlemen had asked the question what good the average dose has done in the last Pharmacopœia, and he would endeavor to answer that question: That it was kept constantly before the eyes of the pharmacist, his assistants and clerks, and particularly of the students, this average dose of drugs, and especially of potent drugs. It was the first time there ever had been satisfactory basis for works on medical practice—works on therapeutics, as well as works on pharmacy. It had brought the students to realize what the average dose was, so that they could use due judgment whenever that dose was exceeded in such a way that it might prove dangerous or harmful. Here was a broad basis which had never existed before, and it was especially valuable for the galenicals.

Mr. Seltzer, of Detroit, said that the idea of the average dose in the Pharmacopœia had never appealed to him at all. Every day in filling prescriptions the question came up to him, Has the doctor prescribed too much? What authority had he to look at at the present time? He had the privilege of taking the list of some manufacturing house, which was put out as an advertisement, and looking in that to see whether the dose was too much. He did not believe any doctor could take exception to the pharmacists calling him up in case a dose exceeded the maximum dose in the Pharmacopœia, but he admitted that he might take exception to his calling him up because the dose exceeded the dose shown in an advertising list.

Mr. Hallberg suggested that he would find that in the Dispensatories, but Mr. Seltzer replied that he wanted it in the Pharmacopœia.

Mr. Stevens, replying to Mr. Hallberg's suggestion as to the value of the average dose to the student, said that his experience had been that students paid very little attention to the dose of the ordinary drug, the prescription, and the manner of getting an accurate dosage, and he was decidedly of the opinion that the maximum dose should be in the Pharmacopœia, as a matter of safety to the pharmacist in dispensing potent remedies. He moved, therefore, that this Section recommend that both the average and maximum dose of potent remedies be introduced into the Pharmacopœia.

Mr. C. E. Caspari asked Mr. Stevens if his conception of the average dose was, that twice the average dose would be the maximum dose. Mr.

Stevens replied, "Not at all"; whereupon Mr. Caspari said that the average dose would not be a true average, then. Mr. Stevens wanted to know what was meant by the minimum dose in constructing the average, anyhow. If the minimum was an uncertain quantity, the average dose would not be midway between minimum and maximum, and, as he had said before, a minimum dose could not be constructed.

Mr. Kraemer said that this was the most intelligent discussion he had ever known on this question, and he believed a sensible conclusion would be arrived at in the matter. He himself was heartily in favor of a maximum dose—a maximum single and daily—with the understanding that if this dose was exceeded the physician should indicate it by a distinguishing mark on his prescription. He believed that it was in the interest of the public to have this maximum single and a daily dose included in the Pharmacopœia. Mr. Kraemer said he wanted the pharmacists to arise and demand their rights on this question. He said that when they went to Washington, there was no question but that the physicians would want the average dose retained, but it was in the interest of the pharmacist that a maximum single and maximum daily dose should also be included in the Pharmacopœia.

Mr. Stevens said he would accept cheerfully this suggestion of a maximum daily and maximum single dose.

Mr. Apple asked where the authority to indicate what the maximum dose should be was to be gotten. He did not think the Section wanted to declare itself in favor of a maximum dose. He was in favor of an average dose as a sort of compromise. He said if there was an average dose there must be an arbitrary maximum dose to base that average on; and who was to determine that? Who was to be the final authority upon the question of a maximum dose, without legal effect? As to the pharmacists rising and demanding their rights, he did not see how they could demand such rights when they were taking away from the medical profession the right to use their judgment as to what they should prescribe.

Mr. Scoville said the question was, not what the doctor prescribed at all—how much. The question was, what was a safe dose. In reply to the suggestion that there was no such thing as a maximum dose, he asked where the doctor stood in that event, if he wanted to give the maximum dose. Referring to Mr. Hallberg's hypothetical prescription calling for a grain of morphine, he asked if there was a pharmacist present that would put that up without questioning it. He wanted to know if there was a pharmacist present who had not had overdoses in his prescriptions. It was oftentimes a delicate question for the pharmacist, and he wanted to draw the line. "We all know that physicians do make mistakes," said Mr. Scoville.

Mr. Asher said he thought perhaps this question of a maximum dose did not appeal to all as it did to him. It appeared to be a question of

looking altogether at the matter from the standpoint of the pharmacist, and not giving the physician due credit. Personally, he believed the physicians would accept this maximum dose very kindly. The medical schools were turning out annually hundreds of students whose knowledge of materia medica was acquired in a sort of offhand way, having no guide at all to these doses. By reference to the Pharmacopœia, they would have a guide that would show them how far they could go. This question of a maximum dose was in the interest of both physician and pharmacist, and would be a guide to each. It was not the object here to state to the physician, "You must give so much, and no more," but it was to be a safe guide to him—a guide which, when he exceeded that limit, would justify the pharmacist in going to him and asking him the question; and no well-meaning physician, when the pharmacist was trying to correct what he believed was an error on his part, would object to that. He thought a little policy on the part of the pharmacist would bring about a proper understanding in this matter.

Mr. Lyons, upon the question of how to know the maximum dose, related an experience coming within his knowledge, where a physician had occasion to give some opium preparation, and went to the Dispensary and found out that the smallest dose that would kill a patient was three grains, so he prescribed two grains and a half.

The Chair asked Mr. Stevens to state his motion again, and Mr. Stevens replied that it was, that the Pharmacopœia should include not only the average dose, but the maximum single and daily dose.

The Chair stated that the motion was, that the Pharmacopœia should include, in addition to the average dose for all medicaments, the maximum single and daily dose for potent medicaments. Mr. Stevens said this was a correct statement of his motion, and the motion was put and carried.

Mr. Kraemer suggested that there should be a statement in the preface to the effect that the physician might, by a proper distinguishing mark, exceed the maximum dose stated. The Chair said he thought this was understood.

Mr. Beringer read the fourth item in the committee's statement of general principles, and as bearing on this proposition, also read the recommendation in the present Pharmacopœia as follows:

"It is recommended that changes in the titles of articles at present official be made only for the purpose of insuring greater accuracy, or safety in dispensing. In the case of newly-admitted articles, it is recommended that such titles be chosen as are in harmony with general usage and convenient for prescribing; but in the case of chemicals of a definite composition a scientific name should be given, at least as a synonym."

Mr. Beringer said that the committee was simply reaffirming that position, with some slight modification.

The item was passed without question.

Mr. Beringer then read the fifth, sixth, seventh and eighth recommendations, relating to botanical names, names for synthetic chemicals, purity rubric, and improved descriptions and definitions.*

Commenting upon the last item read, Mr. Francis asked if the committee meant that there should be included such descriptions as might be necessary to properly identify the substance—in other words, to serve as legal standards for identification. If so, this would involve also the insertion of processes of assay and determination of purity for many substances where such do not now appear. He wanted to know just what was the force of this paragraph.

Mr. Beringer reread the paragraph in question, and said that the reason was that there had been considerable criticism of the pharmacopœial definitions, which had not been prepared as legal standards, and the idea was they should be carefully revised to meet that condition, and the definition should accurately define the commercial product.

The Chair called for further comment, but none was offered.

Mr. Beringer read the ninth item, as follows :

9. Committee on Drug Market: That the Committee on Revision be requested to appoint a special committee to make a thorough investigation of the quality of crude drugs in commerce both in this country and abroad; and to co-operate with the U. S. Government Departments in such investigations, and that this committee be instructed to endeavor to determine the proper limits to variability due to soil and climatic condition or improper handling, and to suggest such improvements as can be introduced in collecting and marketing such wares.

The Chair said that this was a rather far-reaching suggestion, and somebody would have to pay the postage. It was open for discussion.

Mr. Beringer said that a number of drugs were improperly stored, and the committee thought these were matters of proper investigation by the Pharmacopœial Committee, and that the results would be proportionately great.

Mr. Eliel asked if this would have anything to do with oil of peppermint assay. The U. S. Pharmacopœia at the present time required a menthol content of 50 per cent. It would depend very largely on the climatic conditions at the time the crop was harvested, whether the crop would contain such per cent., or more or less. There had been a number of seasons in the last ten years when it would have been absolutely impossible to obtain oil which would come up to the requirements of the U. S. P. and the Pure Food Act. He thought the present menthol requirement was altogether too high for the average crop, and he believed that this criticism would apply to all drugs of this character. It would certainly be a hardship on the druggists of this country to be obliged to comply with the present standard, when it was, as in this case due to causes beyond human control.

* See pages 535 and 536.

Mr. Wood said that there was little doubt in the minds of any one that the Committee on Revision must take into consideration the character of drugs obtainable—the commercial quality of drugs. But on the other hand, it had never been the custom of the Convention to instruct the Committee of Revision as to the manner in which it should do its work, and he did not think it would be good form here to attempt to instruct that committee in such little details. He thought pharmacists might repose perfect confidence in the Committee of Revision, that they would see the necessities of the case and not neglect them.

Mr. Dohme thought the suggestion of the committee was a very good one, as from experience he had found that there were many drugs gathered abroad, as well as in this country, where the gatherers were indifferent, and in many cases ignorant of the correct method and time of gathering and storing these drugs; and it had often occurred to him that it would be proper for some official body to take this matter up and study it, to the end that a better quality of drugs in many cases might be had. In the case of Mexican sarsaparilla, for instance, he said his firm had gotten it with a large amount of inert matter, but when the gatherers were told what they wanted, they proceeded to give them exactly what they wanted. He thought the same was true as to other drugs; they had found as far as Europe was concerned that they had not changed their methods of gathering and storing drugs at the request of the importers of the country. He thought a suggestion of this kind to the Revision Committee, for fear they might overlook it in their deliberations, was timely, and he was very much in favor of it.

Mr. Beringer suggested that all this matter could be carefully investigated, with the view of determining what a good drug was, and the establishment of proper limits. He asked the question as to how a proper standard could be fixed, unless it was possible to determine the rule of variability. He thought the committee could do most excellent work along these lines.

Mr. Lyons thought there could be no question of the great value of acting upon the suggestions here made, but the Pharmacopœial Revision Committee was a body of limited resources, and he did not see how it was feasible for the committee to take such an extensive work as this.

Mr. Wood moved as a substitute that the Revision Committee be requested to take into careful consideration in the effort to establish the purity of crude drugs the quality of drugs commercially obtainable. This would obviate the necessity of instructing the committee how they should go about their work.

Mr. Beringer explained that this was simply a suggestion.

Mr. Raubenheimer seconded the motion just made.

Mr. C. E. Caspari said he believed Mr. Wood misunderstood the intent of the suggestion by the U. S. P. Committee. It was not intended in any

sense to instruct the Revision Committee as to what they should do, but because of the fact that the Pharmacopœia was a national standard, and also that the inspectors of the Agricultural Department frequently found lots of crude drugs which were sub-standard, and the claim made by the owners of these stocks that the market conditions were such that they could not possibly be up to the standard, this suggestion was made. That was the idea, that the Revision Committee, in connection with the government authorities at Washington, could, in the course of perhaps a long time, determine some connection between climatic conditions and the variance in the active principle of drugs. It was not possible for the work to be brought to any satisfactory conclusion by the time the next Revision of the Pharmacopœia was published, but it could do a valuable work, and by the time the following revision was ready to be published a considerable amount of data might be had on the subject.

Mr. Kebler said he thought it was the intent of these recommendations to simply suggest, to give the ideas of this Section as to what was desirable. "How are we going to regulate the countries abroad which collect these drugs?" said Mr. Kebler. He took the case of belladonna-root for illustration, which was excluded if below a certain standard of mydriatic alkaloids. The importers took the matter in hand and advised dealers abroad of the standard, with the result that there is no longer any trouble with belladonna-root.

Mr. Kraemer said he thought the object of this report of the Chairman was merely to authorize his committee, in co-operation with the large dealers and with the government officials, to see that the Committee of Revision had information which would enable them to determine whether, for instance, this year or any year, jalap has a certain content of resin, or again, if catechu can be obtained of standard quality. As a matter of fact, Mr. Kraemer said he did not think these conditions varied as much as might be imagined. If the committee had the proper information, it might establish standards that everybody could conform to, and that drugs of the required efficiency would be supplied.

Dr. Wood said his motion was, that the Revision Committee, in establishing standards, should very carefully consider the quality of drugs commercially obtainable.

Mr. Francis wanted to know if there was any reason for that motion, and if the Pharmacopœial Revision Committee was not to be presumed to be composed of members of common sense, to do just that thing. Mr. Beringer suggested that it would be desirable to hear from Mr. Rusby on this subject.

Mr. Rusby said he was sorry that he was not present to hear the discussion. He thought it might be well, before discussing this question, to say to the Section that there had just arrived from Washington City a very remarkable collection of plants and he directed special attention to the dis-

play of such living plants in the anteroom of the convention hall, where numerous specimens of interesting drug plants were assembled.

Mr. Rusby went on to say that no one was able, under the conditions of the present day, to take a sample of balsam Peru and say whether it was adulterated, because there was not a single specimen available with such perfect record of collection and preservation as to absolutely prove its purity; hence we are forced to base our standards on specimens of the character of which we are uncertain. He said that the conditions as to balsam copaiba were not as bad. What should be the standard for balsam Peru? After struggling with that question for three years, at the port of New York, he was convinced that we would never be able to get a standard for that until somebody went to the place where it was produced and studied its collection and preparation. Last fall Mr. Rusby, when he was going down to Mexico, expected to be in a region where he could study sarsaparilla, vanilla and jalap. He said the reason we now have jalap with 7 per cent. of resin, whereas it used to contain 18 per cent. or more, and below that it was regarded as very poor, required investigation. Now it could not be gotten beyond 7 per cent., and sometimes only 5. Nobody seemed to know, also, what caused the warts on vanilla beans. He believed that it was the duty of the Revision Committee to provide for such investigations as these. Digitalis constitutes another case of the same kind. If it has become a little heated and musty in drying it loses much of its properties. The importers claim that this is unavoidable and that no better drug is obtainable. The question was, What were the conditions on the other side? If good digitalis leaves could not be gotten under any condition, there was no use in fixing a standard. This was one of the most important things the Association could turn its attention to. It should be ascertained whether a drug could be gotten to meet a certain standard; and if not, the standard should be changed. Many of these questions cannot be answered except by studying the drug in its own home, and this is a proper duty for the Revision Committee.

Mr. Hallberg said it seemed to him that Doctor Wood's substitute motion was not very specific; that he objected to the original, in that it appeared to be a little bit dictatorial. He asked why not combine the two, and modify the original so as to make it a suggestion, leaving the matter of the committee for the consideration of the Convention, so as to make it read that it was suggested that the Committee on Revision make a thorough examination, in connection with the Consular Service and other Government Bureaus, into this matter, and formulate a standard for these drugs. He said he offered this as a suggestion.

Dr. Wood said he would be pleased to accept the amendment.

Mr. Rusby said he hoped Mr. Hallberg would withdraw his suggestion to the U. S. P. Committee. He said the Consular Service of the U. S. would not take the trouble; that a consul would get some Indian to do

the work for him, and there was no dependence on them at all. The material thus obtained would not be authentic or reliable.

Mr. Beringer re-read the ninth item in the list of recommendations.

Mr. Apple commented upon the fact that in the item read the word "instruct" was used in connection with the special committee to be appointed. The Chair said the suggestion was, that, after the Revision Committee had been requested, they should instruct the sub-committee.

The Chair stated that if Doctor Wood did not object, the Section would pass on to the next recommendation.

Mr. Kebler said that, before passing the recommendation just read (No. 9), he wanted to say a few words. He did not know the author of that resolution, but he thought it was a good one. A number of years ago they were confronted with that proposition, and they were not out of the woods yet. After going over the matter, with Doctor Wiley, he appointed a committee to consider the various features that confronted them in their work under the Pure Food and Drugs Act. It was found that of the large number of herbarium specimens in the National Museum, collected by various botanists most of them were undoubtedly correctly named, but only in comparatively few instances had the specimens been verified by specialists so as to remove reasonable doubt. The institution knew that, and had told them plainly that these specimens were put there under these conditions. So, in order to make them available for positive work it would be absolutely necessary that the various groups be referred to a suitable monographer. It was decided by the Committee and agreed to by the Smithsonian Institute to have a place reserved in the National Museum for the storing and keeping of specimens of that character. The Smithsonian Institute furthermore agreed to use its representatives in the field to assist in all of these matters. It is a tremendous job, but that was the only way there would ever be a basis for action. They were trying to adjust the situation as rapidly as possible. Just as soon as the new building of the Museum was completed, they expected to have a room there for the especial storing and keeping of these authentic specimens for future reference. Mr. Kebler said they invited the aid of the Bureau of Plant Industry, the Smithsonian Institute or any one qualified in a special subject, be it botany, chemistry, medicine or what not.

Mr. Beringer, in this connection, called attention to Mr. Rusby's recent article on the amount of adulteration in foreign drugs.

Mr. Beringer then moved the adoption of Section 9 of the recommendations as read, and the motion prevailed.

Mr. Beringer read the tenth and eleventh recommendations, referring to standards for crude drugs and standards for powdered drugs.*

The Chair said this was rather a far-reaching proposition, and asked if there was any objection to it, but none was indicated.

* See page 536.

Mr. Beringer read the 12th, 13th, 14th and 15th recommendations.*

The Chair stated that the last recommendation read, relating to time-limit on drugs, was a far-reaching one, and asked if there was any objection to it.

Mr. Raubenheimer said there were some preparations where there was no deterioration. Mr. Beringer responded that they had qualified that by saying "drug and preparation."

The Chair stated that the suggestion had been made to qualify the recommendation by adding "preparations." He asked if there was any other suggestion, but none was offered, and the section was passed, with the amendment indicated.

Mr. Beringer read the 16th and 17th recommendations, relating to fineness of powders and powdering of drugs.†

The Chair said this would include ipecac.

Mr. Beringer read the 18th recommendation :

18. Synonyms: That the proper English name under which the article is commonly sold be given along with the Latin title of each drug and preparation, and that a list of less important or less frequently used names be published with the other tables as a table of synonyms.

Mr. Wetterstroem gave it as his opinion that a list of synonyms would cause a great deal of trouble in some of the States. He said they had all sorts of trouble with this proposition in Ohio, until they succeeded in getting the law changed in 1906. He reminded the members of the successful effort made at the Pharmacopœial Convention of 1900, in Washington City, to change the Pharmacopœia in this respect, and he hoped the same would be done in the next Pharmacopœia. His idea was that if synonyms were to be given, they should be limited to medicinal substances only, and that no synonym should be used that indicated the commercial name of a drug. In response to an inquiry by Mr. Raubenheimer as to camphorated oil, Mr. Wetterstroem replied that was a medicinal substance, and a synonym would be all right in that case. But there were other substances, such as turpentine and lime, and things of that kind, that were common names, and if they were included in the Pharmacopœia, the pharmacist would be compelled to see that they came up to Pharmacopœial standards.

Mr. Beringer said that the provision of the present Pharmacopœia was limited to the sale for medicinal use.

Mr. Cliffe said that in Pennsylvania the fact that camphorated oil was not a synonym in the Pharmacopœia for Liniment of Camphor had been set up in a defense in a case where a prosecution was brought, where the oil contained from three to five per cent. camphor. The gist of the defense was, that camphorated oil was not a pharmacopœial product.

* See page 537.

† See page 537.

Mr. Kraemer gave it as his opinion that there should be a table of synonyms as an appendix to the Pharmacopœia.

Dr. Wood said he wanted to remind the members that the National Food and Drug Act said any substance sold under a name recognized by the Pharmacopœia, and it seemed to him that, even if a table of synonyms was placed in the appendix, it would be taken as found in the Pharmacopœia, and he thought Mr. Wetterstroem's position was well taken.

Mr. Kebler remarked that the Pharmacopœia covered only medicinal drugs.

Mr. Beringer said that the Pure Food and Drugs Act also specified that the nomenclature of the National Formulary was to be used.

Mr. Eliel said that, as to sulphuric acid and hydrochloric acid, he knew that certain retail pharmacists sent orders to their jobbers for such things as they had been in the habit of purchasing and using for medicinal purposes, such as Epsom salt, carbonate of magnesia and other things, and the jobber marked these goods "Technical," and the druggist would then use them in his prescription work. He knew this to be an actual fact, and he thought that there should be some way of making a distinction and preventing a thing that was shipped to be used for technical purposes from being used for medicinal purposes.

The Chair asked Mr. Wetterstroem if he objected to Item 18 as read, and he said he would let it stand.

Mr. Beringer read the 19th, 20th, 21st, 22d and 23d recommendations of the committee, referring to General Processes, Descriptions of Galenicals, Sterilization, Atomic Weights, and Structural Formulas.*

The Chair remarked that structural formulas had not been given, although some attempt had been made in that direction.

Mr. Dunning commended the introduction of structural formulas into the U. S. P. as being helpful to the pharmacist in understanding the character of many chemical formulas. He did not think structural formulas should appear in the U. S. P. because they appeared in the French Codex, but said he would like to hear some discussion on this subject.

Mr. Raubenheimer remarked that structural formulas were in the U. S. P. Pharmacopœia before they were in the French Codex.

Mr. Asher said he believed that structural formulas should be given, but only for all the organics.

Mr. Kremers said this was a very important subject, and was inclined to think the Section should not go on record one way or another on this question. He would not like to see the Association go on record as against structural formulas, particularly at that time, when so few were present to discuss the question. He thought there were so many good things before the Section to discuss that it might be advisable to leave this out.

* See page 538.

Mr. C. E. Caspari said he was one of those who were partly responsible for the introduction of this recommendation, and the chief reason why he opposed the introduction of structural formulas for chemical compounds in the Pharmacopœia was because he considered that there were many far more reliable sources for the structure of formulas than the Pharmacopœia. If the pharmacist wanted to get a reliable structural formula, let him get some reliable chemical work and obtain it. Another reason for not publishing structural formulas was the amount of space required to set them out. For instance, in the case of camphor, it would take nearly half a page to publish the structural formula, and the same was true of a good many other substances.

Mr. Kremers said he was perfectly willing to defer to Mr. Caspari's views in the matter.

The Chair said he thought the members understood the position taken here, and that the Section should proceed to the next recommendation.

Mr. Beringer read the 24th item in the list of recommendations :

24. Discriminating Tests for the Druggist: That the simplest identification tests for the needs of the pharmacist be stated first in the list of tests, and be in special type.

Mr. Francis asked what this section meant, and Mr. Beringer replied that it furnished the pharmacist with a simple identification test.

Mr. Turner, of Philadelphia, asked if this meant that the pharmacist would have to apply the same test for purity that the wholesale dealer and the manufacturer did, and the Chair replied in the negative, saying that this was to give the retailer an identity test he might apply. Mr. Turner said that he thought, in testing for purity the same test should be applied no matter who tested it.

Mr. Beringer read Items 25 and 26 of the committee's recommendations referring to official methods for Physical Constants and Chemical Determinations, and Normal Temperature.*

The Chair said this question was open for discussion but as none was offered, the section was passed.

Mr. Beringer read the 27th and 28th recommendations of the committee; referring to Definition of Admitted Impurity and Distinction between Medicinal and Technical Substances.†

Mr. Wetterstroem asked for information whether that phrase just referred to had ever been passed on by the court. He said the reason he asked this was because the Government had taken up the question of turpentine and the question of alcohol, and it seemed to him that perhaps that phrase in the preface of the Pharmacopœia could have prevented this and similar instances. He said it had prevented the commissioner

* See page 539.

† See page 539 and 540.

in his state from doing anything of that kind, when they had called his attention to it. But if the Pharmacopœial text was adopted as the legal standard, the question was whether the effect of that was to adopt the preface and index, or the whole book from cover to cover, or just the Pharmacopœia proper.

The Chair made the suggestion that perhaps Mr. Kebler, of the Drug Laboratory, could answer this question, as to the force and effect of that phrase in the preface of the Pharmacopœia in regard to the standard for purity and strength—whether it would become operative only when drugs were sold as medicine, or whether it had any force at all; and if so, why turpentine was taken up.

Mr. Kebler responded that if it was clearly established that the article was not intended for medicinal purposes, it was not subject to this law. He said the law stated plainly what a drug was, and it could not be gotten around. For fear of a misapprehension, in the National Formulary it was decided to leave out the appendix. In the preface of the National Formulary it was specifically stated that the appendix was not a part the N. F.

Mr. Beringer read the 29th and 30th recommendations of the committee referring to weights and measures, and Alcohol Content.*

Mr. Francis, commenting on the recommendation as to alcohol content, said that, in accordance with the law at the present time, all medicaments that were put on sale were required to bear on the label a statement of the amount of the alcoholic content, and this section required that the Pharmacopœia should contain under the description of each article a statement as to the proper alcoholic content. He said that unless a considerable amount of judgment was exercised in allowing a sufficient margin of variation for maximum and minimum, there would be piled up a lot of trouble for the retail druggist. The manufacturer could easily standardize his fluidextracts to a variation of one per cent. above or below the amount stated on the label. But the retail druggist, he predicted, would find it a pretty complex problem, and a very expensive process, to adjust this within one per cent. of the standard given in the Pharmacopœia. There would be an element of danger, therefore, unless there was allowed a reasonable variation in regard to the alcoholic content. It might not be embarrassing to the large manufacturer, but it would be very embarrassing to the small maker.

Mr. C. Caspari, Jr. responded that this point had come up in the committee, and the gentlemen on the committee were well aware of the necessity for making a margin of variation above and below the standard to be fixed, and that margin to be 5 per cent. above and five below the actual amount fixed by the Revision Committee, which would allow a variation of ten per cent. in the product. For instance, where a 60 per cent.

* See page 540.

alcoholic strength was required, it might go up to 65 per cent., or be as low as 55 per cent.

Mr. Francis said that this idea carried out, in a measure, his recommendation that a fair margin of variation should be allowed.

Mr. Beringer stated that this completed the reading of the 30 specific recommendations or list of general principles which the committee had proposed, and that they had all been adopted without change. The Chair, in answer to a question by Mr. Dohme, confirmed this statement.

Mr. Dohme stated that the suggestions made covered such a wide scope, and were of such great importance to the manufacturer and the retailer and the jobber, and it was so difficult—in fact, practically impossible—for the ordinary individual to appreciate what they really meant by a casual hearing, especially when not accurately heard, that before the Section went on record as adopting all these recommendations as a whole, it seemed to him the members should have a chance to read them carefully and consider them. He moved, therefore, that the section accept the report of the committee, and that it be printed by the committee before adoption.

The Chair responded that the proposition was, that this report was to go to the Pharmacopœial Convention next week at Washington, and it would be impracticable to have the report printed, circulated and considered before the 10th of May. He suggested that some modification of the motion might be in order; that the report might be considered as a tentative report—be tentatively adopted, subject to revision after further consideration.

Mr. Kraemer agreed with Mr. Dohme that the report was a very extensive one, involving a great many interests, and moved as an amendment to Mr. Dohme's motion that the report be sent to the Revision Committee as an expression of the views of this Section.

Mr. Kebler, also, agreed with Mr. Dohme, because he realized the situation fully. He thought that the reading of the brief presentation that had been made before the Section did not give the members an opportunity of digesting it properly. He knew from experience that frequently by reading over a thing casually it seemed to be one thing, while after careful consideration it was found to be quite another. But he thought that Mr. Dohme must appreciate that this information was simply for guidance, and was not hindering, and for that reason did not think it warranted delaying the matter until it was published.

Mr. Patch supported the motion of Mr. Dohme. He said he believed this was a very important matter, and ought to have very careful consideration at the hand of every member of this Association—not alone of those who were present before the Section, but of many able members who were not present. He thought this report should be printed and circulated, and action deferred to the last meeting of the Section, when it might receive more careful consideration.

The Chair again expressed the opinion that this proposition was impracticable, and suggested that the report be accepted and sent to the Pharmacopœial Convention simply as a report of the Committee. Responding to a question by Mr. Dohme as to whether this meant that adoption by the Association would not be asked, the Chair said he hardly thought it would be fair for the Association at large to adopt it. He thought the report should be accepted for transmission to the Pharmacopœial Revision Committee. The Committee here was a committee of this Association, and necessarily the committee must be empowered with certain rights and prerogatives, and trusted to do their work as best they knew how. It would be rather presumptuous, he thought, for the Section to adopt all these recommendations, especially in view of the small number of members present at this time.

Mr. Dohme agreed to the amendment of Mr. Kraemer. If this set of general principles was adopted by the American Pharmaceutical Association and handed to the Revision Committee it would undoubtedly have a great deal of weight with that body and he thought before that was done these recommendations should be printed and distributed and receive very careful consideration at the hands of the members.

Mr. Kraemer, speaking further on this proposition, expressed the opinion that the Section should adopt the list of general principles as read and discussed; that mimeograph copies of same should be prepared for the use of members, and the subject be presented to the Association in general session for final approval and transmittal to the Pharmacopœial Convention. He thought the report should have the backing of the Association itself, otherwise it would go as the work of individuals.

After some further discussion, participated in by Messrs. Beringer, Dohme, Kebler, Sayre, Eliel and Patch, this suggestion of Mr. Kraemer was concurred in as the sense of the Section, and the list of general principles as read was adopted and referred to the Association in general session.

Mr. Francis said he wanted to impose upon the good nature of the Section long enough to say that he thought they should include as perhaps a final recommendation something to this effect: "That in view of the legal status of the U. S. Pharmacopœia, wherever a substance was included in this authority there should also be appended under each substance, where possible, a practical and accurate description, test or assay, which would enable one to test the quality or strength of the drug." He asked what was the use of having legal standards for a large number of substances for which no tests were provided. The Pharmacopœia was devoid at present of such tests in many cases.

Mr. C. E. Caspari said he thought this was covered by section 27; that wherever the purity rubric was given, a method was given at the end for determining whether the substance was up to the standard. For example,

copper sulphate, he thought, was required to be 99 per cent. At the end of the description of copper sulphate would be a test to determine that fact.

Mr. Beringer reread Item 27 as bearing on this proposition, and he and Mr. Caspari agreed that this point was covered.

Mr. Francis said if the committee was satisfied that that point had been covered he had nothing further to say; but he thought that all recognized the failure of the Pharmacopœia at the present time to give definite tests. It was a legal authority, without provision in many instances to make a test.

Mr. Eugene Selzer, of Cleveland, Ohio, seconded by Mr. Wetterstroem, moved a special vote of thanks to the Committee on U. S. P. for the excellent report they had presented, and this motion was put to a vote and carried.

On motion, the Section then adjourned.

ADJOURNED SESSION—THURSDAY, MAY 5, 1910.

The Section on Scientific Papers was called to order at 10 o'clock a. m., by Chairman M. I. Wilbert.

THE CHAIRMAN: President Rusby has requested that we adjourn promptly at 12 o'clock, as the general session will be held at that hour; and as we have a lengthy program before us this morning, we had better get at it at once. So if the readers of the papers do not mind, we will take up the program as printed. The first paper is by Dr. Lyons, and as he is not here, we will proceed to the second paper, entitled "Comments on the Assay Methods of the U. S. P.," by Mr. W. L. Scoville.

Mr. Scoville then presented the following paper.

SOME COMMENTS ON THE ALKALOIDAL ASSAY METHODS OF THE U. S. P.

BY WILBUR L. SCOVILLE.

The purpose of these comments is not to find fault with the official assay processes, nor to critically analyze all the processes for drug assay in the Pharmacopœia, but to give voice to some personal preferences in methods of work, and to suggest some changes, minor in importance or otherwise, that may be helpful.

First—Some general considerations.

In most of the processes where a liquid is evaporated to dryness in order to get rid of the alcohol, and to get the preparation in shape to extract its alkaloids with an ethereal or chloroformic liquid, evaporation is conducted either with or without sand. Then the residue which adheres to the dish is directed to be dissolved in, or rinsed with, the chloroformic or ethereal solution—which is impracticable. These residues are not soluble in chloroform or ether, and hence are not rinsed thereby. They

are all softened by, and partially soluble in, the alkali which is to be used in the next step of the process, and the dish can be thoroughly cleansed of its extractive by the alkali and water. So ammonia water or bicarbonate solution is an easier and more effective menstruum to transfer the residue to the ethereal or chloroformic solvent.

Sand is not a good absorbent, and therefore fails of its chief purpose. Sawdust is much better, leaves less residue adhering to the dish, and produces a powdery instead of a lumpy mass to extract. I have never felt the necessity of preparing the sawdust by washing with alkali or ether, then with acid and drying. Ordinarily, carpenter's sawdust, just off the floor, will serve every purpose.

The next general step is extraction of the alkaline ethereal or chloroformic solution with acid. Sulphuric acid is directed in every instance, and in normal volumetric solution or dilutions thereof. But hydrochloric acid is better in some cases (*Cinchona*, *Coca*, *Physostigma*), because it removes the alkaloid more rapidly. Why not use it? the results are the same.

Then the very weak acids are prone to emulsify, sometimes much too easily. Stronger acids may be preferable for this reason. *Physostigma* is particularly troublesome, and I prefer to use ten per cent. hydrochloric acid for each shaking. It conduces to peace of mind and cheerfulness as well as to facility in results.

Emulsions are the irritating factors in alkaloidal assays. I have often succeeded in breaking an alkaline emulsion by a liberal use of solid potassium carbonate, and an acid emulsion by strong acid. "*Similia similibus curantur*," but not in homeopathic doses.

The use of stronger acids also results in some cases in keeping the total quantity of liquids used down to a minimum. Aside from the question whether a moderately strong acid combines more quickly and completely with the alkaloids, the quantity needed for each shaking is smaller because emulsions are less liable to form. And the smaller the quantity of one liquid, the less is required of the next immiscible solvent for the subsequent extraction. So a 5 per cent. acid may be much quicker than a 1 per cent. or weaker.

A third general consideration is that when a fluid extract or tincture is evaporated to drive out the alcohol, then mixed with a dilute acid and filtered, as in the assay of fluid extracts of *aconite*, *ippecac*, etc., the addition of a clarifying agent is always advisable. It not only insures a clear filtrate, which is doubtful without it, but it prevents the clogging of the filter, which is likely to occur without it. Talcum, kaolin, infusorial earth or paper pulp, are each suitable. This step should then be continued until the filtrate gives no reaction with Mayer's reagent.

Finally, a word about the complete extraction of alkaloids from aqueous or ethereal solvents. The general directions are to continue shaking with

the immiscible liquid until the aqueous solution, made acid, if necessary, gives no precipitate with Mayer's reagent. But aconite, coca, ipecac and some others contain alkaloids which are not easily soluble in ether, and are not intended to be included in the assay.

So with these drugs it is impracticable to test the aqueous solution. Nux vomica also continues to respond to Mayer's reagent after all the strychnine is removed. Such drug assays must have the test applied to the residue obtained by evaporating a small amount of ethereal or chloroformic solution, after dissolving this residue in a drop or two of weak acid. Coniine is much more sensitive to Wagner's than to Mayer's reagent, and caffeine responds to iodine solution, in acid solution, but not to Mayer's.

Thorough shaking is also necessary before the test is applied. This seems so obvious as to make attention to it superfluous, but I have reason to believe that insufficient shaking is often the reason for low results reported. In one or two instances the Pharmacopœia directs the shaking to be continued for one or two minutes. It were better if *all* shakings were to be directed to continue two minutes. Solution is not an instantaneous process, and in drug assays it takes effect mostly during the shaking. Hence three portions of solvent thoroughly shaken for two or three minutes each, may accomplish as much as five or six portions with short agitations on each. In this work the rule to "make haste slowly" well applies.

Aconite.—The chemical assay of aconite has been much criticised, but that the method of the Pharmacopœia has a real value can scarcely be denied. It could well be supplemented by the Squibb physiological test, which would add much to its value. The physiological test would be best applied to the drug-percolates or extract, and also checked by two or three observers, since individual susceptibility varies (in the same individual), and the test is so quickly made. The drug and fluid extract should respond to a dilution of not less than 1 in 800, and the tincture at not less than 1 in 80.

In the chemical assay, it is well to weigh the alkaloidal residue before titrating, because the tendency on this assay is to read the end-reaction too quickly. When one gets more alkaloid by titration than by weighing, as may easily happen, the warning can be immediately heeded. Or it may be that most of the active aconitine has decomposed into the antagonistic aconine, of lower molecular weight and higher titrating value. A re-reading of the end point in titration, and supplemental physiological test, will together solve the problem for practical results. In the assay of the fluidextract, a clarifying agent is necessary for the first filtration.

Belladonna, Hyoscyamus, Scopolia and Stramonium.—The processes for the drugs are satisfactory when a careful use of Mayer's reagent is used to insure complete extraction. On the preparations, the process is all right if the preparation is fresh, but, as pointed out in another paper ("The

Keeping Qualities of the Alkaloidal Fluid Extracts and Tinctures"), with an old preparation the process does not extract all of the alkaloid unless alcohol be added. The process may be modified in this way. When the chloroform washings (shaken with the fluid extract or concentrated tincture) cease to give a residue which reacts with Mayer's reagent in acid solution, add 10 Cc. of alcohol to the separator, and a fresh portion of chloroform and again shake. Evaporate about $\frac{1}{2}$ Cc. of the chloroformic solution which has separated, on a watch glass, add two or three drops of diluted sulphuric acid, then a drop of Mayer's reagent. If a precipitate occurs the extraction must be continued until chloroform ceases to remove any alkaloid from the aqueous-alcoholic liquid.

Cinchona.—In order to secure constant results in ether-soluble alkaloids, the aqueous solution from which the final extraction with ether is made, must be fairly uniform in volume. Hydrochloric acid extracts more rapidly than sulphuric, and 25 Cc. of 2 per cent. hydrochloric acid is usually sufficient. If less than this is used, the mixed acids may be diluted to 25 Cc. If more is used they should be evaporated to 25 Cc., or some larger bulk of acid solution designated for the final shaking with ether. The temperature and time of standing in the final extraction are also important.

Coca.—Coca preparations are unreliable at best, and should be dropped; but if coca or preparations of coca are to be assayed, the first extraction should be with petroleum ether to eliminate the hydrolyzed alkaloids. When ether (ethyl oxide) is used, the results will depend entirely upon how much ether was employed, and the alkaloid extracted will always be a mixture. With petroleum ether, cocaine is the result, and concordant assays can be made. With ethyl ether, half or more of the alkaloids obtained may be ecgonine.

Colchicum.—Colchicine, which is soluble in water, is easily changed to colchiceine, which is almost insoluble in water, by heating the aqueous solution. This is the first difficulty in the assay, and if a high percentage of alkaloid is present there is considerable danger that a portion of it will be hydrolyzed and filtered out. This is particularly likely to occur in the assay of colchicum extract, which is rich in alkaloids.

To avoid this formation of the insoluble colchiceine, it is necessary that the alkaloidal solution be kept neutral or acid, and that heat be avoided as much as possible, for hydrolysis will occur even in acid solution, with heat. And it is evident that it does occur in the heating of the aqueous solution in the U. S. P. assay, to some extent.

A second difficulty is that of obtaining a full yield of alkaloid which will be free from fat, not an easy matter when a single filter is depended upon to remove it. I prefer to add a fragment of paraffin to solidify the fat, when a perfectly clear filtrate, without oil streaks or globules, is obtained. I also prefer the Gordin-Prescott method of assay, which has received

preference in the Drug Bureau of the Department of Agriculture, by L. F. Kebler, Chief, after comparative tests. But colchicum assays offer a fruitful field for investigation.

Conium.—The official assay is tedious. Since coniine has a markedly alkaline reaction, and is easily titrated, a volumetric assay would seem to be preferable. The alkaloid may be extracted from an alkaline (carbonate) solution by ether or petroleum ether, the ethereal solution evaporated by an air-blast over a measured quantity of deci-normal acid, and the latter titrated. Such a method is much quicker than the U. S. P., and gives concordant but lower results. Its accuracy remains to be shown.

Gelsemium and preparations should be assayed.

Guarana.—The process is quite satisfactory. It can also be used for Kola and preparations.

Hydrastis.—Too much of the drug is used. The alkaloids precipitated from 10 gm. of drug come down in masses which the ether is unable to dissolve, even when used in large excess. The alkaloids finally weighed should represent not more than 5 gm. of drug, and 2.5 gm. is better.

The assay processes for the fluidextract and tincture are almost free from berberine, because of precipitation with potassium iodide. It would seem better if the drug and its preparations were all assayed by the same general method.

Puckner's modification of the fluidextract assay (washing the insoluble portion on the filter instead of taking an aliquot portion of the filtrate) gives a little higher, and probably more accurate results, and takes twice as much time for the assay. Since comparative and not absolute results are the essential thing, it is a question whether the higher results are worth the additional time and labor.

Fluidextract of *hydrastis* has several times been found with crystals of hydrastine in the bottom of the bottle and the official strength appears to be about as high as the menstruum will hold of *hydrastis*.

Ipecac.—Too much drug is used. The alkaloidal residue from 10 gm. of drug or 10 Cc. of fluidextract is so highly colored that titration is very difficult. If the assay be based on 5 gm. of drug or 5 Cc. of fluidextract for final results, much less coloring matter is extracted and titration is easier. Even then the amount of alkaloid finally titrated is larger than in most of the U. S. P. assays.

It is impracticable to extract the alkaline aqueous fluid (obtained by rendering the acid washings alkaline) until it gives no test with Mayer's reagent. The ethereal washings should be tested after thorough shaking.

In filtering the acid-aqueous fluid obtained in the first step of the process from the fluidextract, a clarifying agent is helpful.

Nux Vomica.—This assay forms emulsions very easily which are best avoided by the use of stronger acid for extraction. I prefer to use a 10 per cent. sulphuric acid in the first shaking and a 5 per cent. acid in sub-

sequent shakings, when there is little danger of emulsifying. Any slight emulsion which may form at this stage is easily broken by heat.

It is not always practicable to extract the acid solution, after rendering alkaline, until it ceases to react with Mayer's reagent. The chloroformic solutions must be tested to ascertain when extraction is complete.

The necessity for using a nitric acid which contains a trace of nitrous acid for oxidizing the brucine, has several times been pointed out. The safer plan is to add a fragment of sodium nitrite, or to warm the strong acid with a few granules of sugar, as suggested by Dr. Lyons.

The directions to evaporate the fluidextract or tincture to dryness, then dissolve the residue in a mixture of ether, chloroform and ammonia, are impracticable. The residue may be softened with ammonia water, then rinsed into the chloroform (ether is unnecessary) with water, but the volume must be kept down to its lowest possible limits or a troublesome emulsion will be formed.

Opium.—During the last six or seven years I have made a considerable number of comparisons between the U. S. P. and Stevens' method of assay. The results have been so constantly in favor of the latter method that I have practically abandoned the U. S. P. method.

Stevens' method gives results about 0.1 per cent. higher than the official method, and the results are quite as uniform. It takes less than a quarter as much time, gives a very pure morphine, and is simple in operation. It calls for accurate measurement of the water used, and only a burette is suitable for measuring. It is altogether a more desirable method of assay.

Physostigma.—This drug gives troublesome emulsions which can scarcely be avoided when the weak acid directed by the Pharmacopœia is used. A 10 per cent. acid avoids this, and hydrochloric acid extracts the alkaloids more rapidly than sulphuric. The 10 per cent. hydrochloric acid can be used in 5 Cc. portions, and when extraction is completed, the mixed acid solutions are best neutralized with solid sodium bicarbonate, cautiously added. In this way the total bulk of liquid is kept small, and the assay proceeds smoothly. The amount of tincture used for assay should be doubled.

Pilocarpus.—The assay process is quite satisfactory. The amount of fluidextract used for assay should be doubled, and the alkaloids from 10 Cc. obtained for the final titration.

Veratrum.—Should be assayed and its preparations standardized.

THE CHAIRMAN: The paper is before you, and as we have a number of others along the same line I would suggest that if practicable, you confine your remarks to the distinct question pervading the paper, or to making any exceptions that you care to make, to the statements made, and then take up the general discussion of the subject of pharmaceutical assays after these several papers have been read. Are there any exceptions to be taken to the statements made by Mr. Scoville?

MR. A. H. CLARK: I would like to ask Mr. Scoville a question. He says he has found difficulty in old preparations of belladonna, scopolia, hyoscyamus and stramonium, in extracting all of the alkaloid.

MR. SCOVILLE: Yes, not in the drug, so far as I know, but the extracts and tinctures,

MR. CLARK: We have an extract of stramonium in our school, which was originally assayed by Professor Puckner, and has been every year since by myself, it is now, I think, seven or eight years old, and is the same to-day as when it was made. We have no difficulty at all with it.

MR. SCOVILLE: I would like to ask if you have any trouble in the emulsion forming?

MR. CLARK: None at all, to speak of. I have never had any trouble with this particular preparation at least.

THE CHAIRMAN: Mr. Lyons has just come in, and we will get him to read his paper on "Assay Processes of the U. S. P."

Mr. Lyons here read his paper, as follows:

ASSAY PROCESSES OF THE U. S. PHARMACOPŒIA.

BY A. B. LYONS.

The assay processes of the U. S. P., VIII, were the outcome of a vast amount of pioneer work. It would be strange if they were not capable of great improvement. They have been severely criticised for their shortcomings and inconsistencies, and yet in the hands of experienced operators they have nearly all proved to be practical and capable of giving a fair indication of the quality of the drug or preparation assayed. At the same time there is room for improvement, and the next revision is likely to show a great advance in this department.

GENERAL CONSIDERATIONS.

1. In the present Pharmacopœia there is provided for each drug and for each preparation assayed, with a few exceptions, a special assay process, every step of which is described in minute detail. This involves much needless repetition. For a number of the assays a single process may be employed which should be described in detail in the Appendix and not repeated under each drug. In a similar way a model process could be prescribed for the assay of a fluidextract and another for that of an extract. Only in the few cases where these model processes require modification would it be necessary to give in the body of the Pharmacopœia a detailed process.

2. An obvious fault in our present assay processes is the absence of identification tests for the alkaloids separated in the assay. In most cases, indeed, it is a mixture of alkaloids that is obtained, but results will be unsatisfying if there is not some proof that the alkaloids found are such as should be present. One check on results is so easily applied that it should be part of the routine of every assay in which the alkaloid is determined

by titration with volumetric acid. The *weight* of the alkaloid separated should invariably be noted and compared with the result of the titration. As a rule titration gives a figure notably less than the observed weight of the crude alkaloid—often ten or even twenty or twenty-five per cent. less. When the molecular weight of the alkaloid is very high, as in the case of aconitine, the presence of some other alkaloid will reveal itself by a titration result exceeding the weight of the crude alkaloid.

3. In our present assay processes the alkaloid is generally extracted from the drug or extract, the ethereal solution "shaken out" with acid, and the alkaloid again extracted in purer form by shaking out with an appropriate solvent after rendering the solution alkaline. Some loss of alkaloid in this triple extraction is inevitable. In the assays of the Swiss Pharmacopœia there is generally a single extraction of the alkaloid, which is then determined by direct titration with volumetric acid. Results are generally distinctly higher by this method, but it is possible that our method gives as true a valuation of the drug. The new committee will no doubt give the two methods a careful study and decide which on the whole gives the more trustworthy results.

4. In our present assay processes alkalimetical titrations are in most cases prescribed for determination of the several alkaloids. Results of such titration are not always satisfactory. Query. Is there not some other way of making determinations of some of the alkaloids? A paper recently published by Dr. Heikel Gunnar has revived interest in the use of Mayer's reagent, once extensively used, but discarded of late years as lacking in exactness. Dr. Gunnar adds to the solution containing an alkaloid an excess of Mayer's reagent, and then determines the excess of mercury by titration with silver nitrate after addition of potassium cyanide. He claims a degree of exactness for his results that should make it available for the purposes of drug standardization. It may prove in the case of certain drugs to afford the most expeditious procedure. Even if it be not adopted as the official method of determining any alkaloid, it may at least serve to confirm the result of alkalimetical titration where there is doubt regarding the identity of the alkaloid extracted. In case at least of colchicine it furnishes certainly the only titration method as yet known.

OPIUM ASSAY.

The lime assay has still warm advocates, and it commends itself by its rapidity and by the exceptional purity possible of the morphine which it extracts. However, the process involves the principle of the aliquot part, with an inevitable uncertainty about the aliquot, and hence will practically not find favor with the new committee.

Our present assay method is satisfactory, but may be improved in several particulars. The two filters on which the morphine is collected should be of exactly equal weight [or else the difference in weight, which

should not exceed ten milligrams, should be marked plainly on the outer (heavier) filter, and taken into account in the weighing of the morphine], and the morphine should be weighed after drying on the inner filter, with the outer used as counterpoise. It is not necessary to pass the ether through the filter. It should be decanted into a small beaker (to make sure that no morphine crystals go with it), and then rejected, using afterwards three portions at least of 15 Cc. each to complete the removal of narcotine, etc., each portion being decanted into the beaker before rejection. The solution containing the morphine crystals is to be brought upon the double filter in the usual manner, and when this has drained, the remaining crystals in the beaker and flask are to be transferred to the filter by aid of a saturated aqueous solution of morphine, with which the crystals are to be thoroughly washed. When drained, the filters containing the crystals are to be carefully removed from the funnel, pressed with caution between folds of filter-paper, and dried at a temperature not exceeding 60° C.

The crystals after weighing are to be transferred to a small beaker, in which they are to be treated with a concentrated lime solution, such as the liquor calcis saccharatus of the British Pharmacopœia. This will dissolve the morphine almost instantly. The solution is to be filtered through the same double filter, which is to be washed with distilled water, of which no more should be used than necessary, the filters again dried and the insoluble residue weighed and deducted from the weight of the crude morphine.

An alternative method which seeks to obtain the morphine in a condition sufficiently pure for weighing is the following: After reducing the opium solution to a weight of 20 Gm., add 80 Cc. of alcohol, U. S. P., shake the flask well, and set aside until the precipitate settles. Filter the solution through a small filter, wash the precipitate on the filter with a mixture of alcohol 4 volumes, water 1 volume, until the filtrate runs through quite colorless, evaporate the alcoholic solution to a syrupy consistence, add distilled water 25 Cc., evaporate once more to a syrup, transfer to a small Erlenmeyer flask, and make up with distilled water to 20 Gm. From this point proceed as usual, with modifications given above. The morphine is so nearly pure that it is not necessary to treat it with a lime solution. If desired it may be dissolved in volumetric acid, and the morphine determined by residual titration with volumetric alkali.

CINCHONA ASSAY.

A capital improvement in this assay is the initial procedure adopted in the new Swiss Pharmacopœia. The powdered bark is put into a flask with a prescribed quantity of diluted hydrochloric acid and heated on a steam bath during fifteen minutes. After cooling a given weight of ether-chloroform (2 : 1) is added followed by a solution of sodium hydroxide.

The mixture is then shaken vigorously and continuously during ten minutes, powdered tragacanth is added, the mixture shaken and left at rest five minutes, after which an aliquot portion of the ether-chloroform is poured off. The treatment with hydrochloric acid effects a very rapid and complete extraction of the alkaloid; herein consists the important improvement. Another improvement consists in the direct titration of the crude alkaloid with volumetric acid. The alkaloidal residue is treated three times with ether (5 Cc.) which is evaporated; it is then dissolved in absolute alcohol, haematoxylin indicator is added, and decinormal hydrochloric acid is run in from a burette until the color changes to red-brown. More water is then added and the titration continued until the color becomes citron yellow, each Cc. of decinormal acid corresponding with 30.4 milligrams of alkaloids. The whole procedure—determination of total alkaloids—consumes less than one hour, and duplicate assays are said to agree well.

For practical purposes, the U. S. P. plan of determining alkaloids gravimetrically is probably equally good, although the alkaloidal residue contains a not inconsiderable proportion of impurities.

Whether or not a double standard for cinchona bark (yellow) is desirable, we certainly gain more complete information regarding both the therapeutic and the commercial value of a bark by ascertaining in addition to the percentage of total alkaloids the proportion of "ether soluble" alkaloids present. The process of the U. S. P. VIII for determining this datum is faulty, in that the prescribed conditions do not insure complete separation of the "insoluble" alkaloids. The ethereal solution of the alkaloids is brought to a temperature below $20^{\circ}\text{C}.$, and shaken continuously two minutes, then allowed to stand ten minutes at $15^{\circ}\text{C}.$ The directions should be to reduce the temperature to $15^{\circ}\text{C}.$, and shake continuously ten minutes, maintaining that temperature; otherwise the solution should be kept for a much longer time—at least 30 minutes—at $15^{\circ}\text{C}.$, the preliminary shaking having been continued as much as three or four minutes.

Determination of quinine by any one of the several methods that have been proposed, or gravimetric determination of precipitated tartrates (indicating the proportion of combined quinine and cinchonidine), are procedures needlessly circumstantial and time-consuming, and therefore can hardly be recommended in the approximate valuation of cinchona and its preparations.

ACONITE ASSAY.

There seems no good reason for employing in this assay a process differing in any essential particular from that prescribed for the mydriatic drugs. Pure ether is perhaps to be preferred to ether-chloroform as the final solvent in extracting the alkaloid. It is particularly important in this assay to make sure that the alkaloid determined consists really of aconitine.

It seems probable that in assays of the crude drug, if the drug is fresh and in good condition, the alkaloid obtained by the official assay process does usually consist mainly of aconitine. Old samples of drug, particularly if they have been exposed to dampness, and preparations of the drug that have been extracted by aid of heat, yield alkaloid much of which is not aconitine. Hence it is necessary always to weigh the alkaloidal residue as a check on the titration, and advisable also to resort to Squibb's test. A tincture (1 : 700) of an aconite which yields 0.5 per cent. "aconitine" by the U. S. P. assay process should produce pronounced tingling of the tongue and lips when tested by Dr. Squibb's method.

The new French Codex prescribes a method for determining aconitine quite different from that of any other pharmacopœia. An aqueous solution of the alkaloid in form of a nitrate is precipitated with silico-tungstic acid. The precipitate is collected on a filter, washed, dried at 100° C., ignited and weighed. The weight of the residue of silica is multiplied by the factor 0.793 to give the weight of the aconite. This plan should be studied by the new committee, and may possibly prove to be the best solution of the problem of a reliable aconite assay.

COLCHICUM ASSAY.

The method adopted by the U. S. P. for purifying crude colchicum for gravimetric determinations is far from satisfactory. The impurities on the one hand are not completely removed, while alkaloid is unquestionably lost. One of the most satisfactory methods for removing impurities consists in adding to the alkaloid some hard paraffin and treating with water to dissolve out colchicine. Another plan is to treat the aqueous solution from which colchicine is to be extracted with lead subacetate, filter, treat an aliquot portion of the filtrate with sodium phosphate in powder to remove excess of lead, filter again, and extract the colchicine with chloroform from an aliquot portion of the last filtrate. On the whole this plan seems as satisfactory as any that has been proposed.

Purification by solution in chloroform, addition of ether and precipitation with petroleum ether, is recommended by some. I have had no experience with it, but suspect that results obtained are too low.

Personally I have always maintained that colchicine could be most quickly and satisfactorily determined by the use of Mayer's reagent, even when used by the old Jacobson method. Recently Dr. Gunnar Heikel has published a method by which quite exact results can be reached in titrations with Mayer's reagent, and his method applied to colchicine determinations seems to leave nothing to be desired either in rapidity of execution or in practical accuracy of results.

Since this paper is intended only to introduce a discussion on assay methods of the Pharmacopœia, it is better not to attempt to render it complete, but rather to direct attention to some of the more important

assay processes. There has been recently published in the *American Druggist* a more complete discussion of the whole subject, in a paper prepared by the writer for the International Congress of Applied Chemistry, and to this I may refer any who are disposed to complain of the incompleteness of the present very hastily prepared paper.

THE CHAIRMAN: The next paper on our program is so closely related to the one read by Mr. Lyons, I will ask Mr. Dohme to present it now, and we can then discuss the two together.

MR. DOHME then read a paper entitled "International Pharmacopœial Assays."

ASSAY OF OPIUM, NUX VOMICA, AND CINCHONA, BY THE PROCESSES
OF SOME OF THE NEWER PHARMACOPŒIAS.

BY A. R. L. DOHME AND H. ENGELHARDT.

Since the publication of the U. S. P. in 1905, thirteen pharmacopœias of other countries have appeared. In the work about to be described, opium, nux vomica and cinchona were examined by the methods of eleven of these pharmacopœias, two of them, *i. e.*, the Russian and the Servian, having been omitted. The methods of these eleven books were compared with those of the U. S. P. and the two older pharmacopœias, *i. e.*, the German and the English pharmacopœias. The methods are given in detail as follows:

OPIUM.

1. U. S. P.

2. German Pharmacopœia.

Six Gm. of the powdered opium are triturated with 6 Gm. of water, the mixture rinsed with water into a dry tared flask, and more water is added until the weight of the mixture is 54 Gm. After allowing the flask to stand for one hour, with frequent shaking, the contents are pressed through a piece of dry muslin and 42 Gm. filtered through a dry folded filter of 10 Cm. diameter into a dry flask. To this filtrate 2 Gm. of sodium salicylate solution (1 to 2) are added, and the mixture shaken vigorously. After settling, 36 Gm. of the clear liquid are filtered through a dry filter of 10 Cm. diameter into a flask and mixed by rotating with 10 Gm. of ether and 5 Gm. of normal ammonia solution. The flask is then closed, shaken well for ten minutes and allowed to stand for 24 hours. Then first the ethereal layer is poured on a plain filter of 8 Cm. diameter, and to the aqueous liquid remaining in the flask 10 Gm. more of ether are added, the mixture rotated for a few minutes, and the ether poured on the filter again. After the ethereal liquid has been filtered, the aqueous solution is transferred to the filter and filter and flask washed three times with 5 Cc. of water saturated with ether. The morphine crystals on the filter are dissolved in 25 Cc. of tenth-normal hydrochloric acid and the solution poured into the flask in which the morphine was allowed to crystallize. The contents of the flask are then transferred to a graduated flask of 100 Cc. contents and

filter and flask washed with sufficient water to obtain 100 Cc. of solution. Of this solution 50 Cc. are transferred to a bottle of flint glass of about 200 Cc. contents, then 50 Cc. of water are added and sufficient ether to produce a layer of the latter about 1 Cm. thick. After the addition of five drops of iodeosin solution, tenth-normal caustic potash is added, shaking well after each addition, until the aqueous layer has assumed a pinkish color. For producing this color not more than 5.4 Cc. and not less than 4.1 Cc. of caustic alkali should be required. The aqueous liquid not used for titration should be used for the identification of morphine.

3. Danish Pharmacopœia.

6 Gm. of dry powdered opium are triturated in a mortar with a small quantity of water, and transferred to a tared flask with sufficient water to make the total weight of the mixture 66 Gm. The flask is allowed to stand over night with occasional stirring, the mixture then filtered, and to 50 Gm. of the filtrate 2 Gm. of normal ammonia water are added, and after rotating, the mixture is filtered at once through a filter of 10 Cm. diameter. To 44.2 Gm. of the filtrate, equal to 4 Gm. of the opium, 10 Gm. of ether are added, the mixture mixed well by rotating and then 4 Gm. of normal ammonia was added. The flask is stoppered well and after shaking allowed to stand over night. A very complicated method of filtering the ether by the aid of a syphon is then given, and both the ether and the aqueous liquid containing the morphine are collected on two different filters. After the morphine is collected on the filter, it is washed with 5 Cc. of water saturated with ether and dried at 100° C. The morphine is then dissolved in 25 Cc. of tenth-normal hydrochloric acid and titrated in the usual way with iodeosin solution as indicator.

4. Swiss Pharmacopœia.

6 Gm. of opium are triturated with 6 Cc. of water to a uniform paste and the mixture rinsed with water into a tared flask until 54 Gm. of mixture are obtained. The mixture is then allowed to stand for one-half hour with frequent shaking, when 38 Gm. are filtered through a dry folded filter of 10 Cm. diameter, mixed by rotation with 2 Gm. of normal ammonia solution, and filtered at once through a dry folded filter of 10 Cm. diameter. 36 Gm. of the filtrate are mixed in a flask with 10 Cc. of ether and 4 Gm. of normal ammonia solution. The bottle is then stoppered and shaken well for 10 minutes. To remove any emulsions produced by the shaking, 10 Cc. of ether are added and the mixture allowed to stand for one-half hour. After this period the ethereal solution is filtered through a filter of 8 Cm. diameter, and 10 Cc. more of ether are added, which is filtered also. Then the aqueous liquid is poured on the filter, and flask and filter washed twice with 5 Cc. of water saturated with ether. The flask and filter are dried at 100° C.

The crystals on the filter are then transferred as much as possible to the flask and any morphine remaining on the filter dissolved in 25 Cc. of tenth-normal hydrochloric acid, which is also added to the flask. The solution in the flask is then transferred to a graduated flask of 100 Cc. contents, and the filter washed with water until the solution measures 100 Cc. 50 Cc. are then titrated in the usual way with iodeosin. Not more than 5.5 Cc. of tenth-normal caustic alkali and not less than 4 Cc. should be necessary for producing a pink color in the aqueous liquid. 1 Cc. $\frac{N}{10}$ acid is equal to 0.0285 Gm. anhydrous morphine.

5. *Hungarian Pharmacopæia.*

Opium dried at 60° C. should contain 10 per cent. of morphine. This is determined in the following way: The opium is first freed from the poppy leaves and the seeds of the various species of rumex with which the gum opium is usually covered and dried at 60° C. 6 Gm. of the dried powdered opium are then transferred to a tared Erlenmeyer flask, with sufficient water to make the mixture weigh 54 Gm., and the mixture is shaken well for a quarter of an hour. 42 Gm. of the aqueous liquid are filtered through a filter of 8 Cm. diameter into a cylinder mixed, by gentle rotation, with 2 Cc. of normal ammonia water, and then filtered at once. 36 Gm. of the filtrate are transferred to an Erlenmeyer flask of about 100 Cc. contents, 10 Gm. of pure acetic ether are added, the liquids mixed well, and then 4 Gm. of normal ammonia water are added. The mixture is shaken well for ten minutes, and after the addition of 10 Gm. of acetic ether allowed to stand for ten minutes longer. The morphine is then collected on a filter, washed with water saturated with acetic ether in the usual way, and the morphine dried at 100° C. to a constant weight.

6. *Swedish Pharmacopæia.*

Six Gm. of the powdered opium are transferred to a tared flask and water is added until 54 Gm. of the mixture are obtained. The mixture is shaken for fifteen minutes and then filtered through a filter of 10 Cm. diameter. 38 Gm. of the filtrate are mixed with 2 Gm. of normal ammonia water by rotating, and this mixture filtered at once. To 36 Gm. of the filtrate 10 Cc. of acetic ether and 4 Gm. of normal ammonia water are added, and the mixture shaken for ten minutes. Then 10 Cc. more of acetic ether are added and mixed with the liquid. The liquid is then filtered. First the acetic ether is poured on the filter, and after this has passed through, 10 Cc. more of acetic ether are added, mixed with the liquid, and filtered again. Then the aqueous liquid is poured on the filter and the morphine, after perfect draining, washed with 5 Cc. of water saturated with acetic ether. The residue on the filter is then dissolved in 25 Cc. of $\frac{1}{10}$ normal hydrochloric acid, the solution filtered into a glass-stoppered flask and the filtrate washed with water until about 100 Cc. of

total liquid are obtained. The acid liquid is then titrated in the usual way with iodeosin as indicator.

7. *Austrian Pharmacopœia.*

6 Gm. of powdered opium, previously dried at 100° C., are triturated in a mortar with 10 Gm. of water and transferred to a tared flask with sufficient water to obtain 60 Gm. of mixture. The flask is then shaken for $\frac{1}{4}$ hour and the mixture filtered through a filter of 10 Cm. diameter. 43 Gm. of the filtrate are mixed by rotating with 2 Gm. of ammonia water and filtered at once through a filter of the same size. To 40 Gm. of the filtrate, 10 Gm. of acetic ether and 4 Gm. of normal ammonia water are added, and the mixture shaken for ten minutes. Then 10 Cc. more of acetic ether are added and the mixture filtered in the usual way through a tared filter and the flask and filter washed with about 5 Cc. of water saturated with acetic ether. The morphine is then dried at 100° C., and weighed.

8. *Belgian Pharmacopœia.*

6 Gm. of powdered opium, previously dried, are triturated in a mortar with 6 Gm. of water and then transferred to a tared flask with sufficient water to make the total weight of the mixture 54 Gm. The flask is then allowed to stand for one hour, and 42 Gm. of the liquid are filtered through a folded filter of 10 Cm. diameter. To the filtrate 2 Gm. of normal ammonia water are added, mixed well by rotation, and the liquid filtered at once through a folded filter of 10 Cm. diameter. 36 Gm. of the filtrate are mixed in a weighed Erlenmeyer flask with 10 Cc. of acetic ether and 4 Gm. of normal ammonia solution are added. After shaking continuously for 10 minutes, 10 Cc. more of acetic ether are added to break up the emulsion. The liquid is then filtered, pouring off the acetic ether first. After this has passed through the filter, 10 Cc. more of acetic ether are added, mixed by rotation, and decanted again. Then the aqueous liquid is added to the filter and the flask washed twice with 5 Gm. of water saturated with acetic ether, which is also added to the filter. After the flask and filter have drained well they are heated to 100° C. The crystals on the filter are then transferred to the flask, and the heating continued until a constant weight is obtained.

9. *British Pharmacopœia.*

Triturate together 14 Gm. of dry powdered opium, 6 Gm. calcium hydroxide, and 40 Cc. of water in a mortar until a uniform mixture results; add 100 Cc. of water and stir occasionally during half an hour. Filter the mixture through a plaited filter, about 10 Cm. in diameter, into a wide-mouthed bottle, having a capacity of about 300 Cc., and marked at exactly 104 Cc., until the filtrate reaches this mark. To the filtered liquid (representing 10 Gm. of opium) add 10 Cc. of alcohol (90 per cent.)

and 50 Cc. of ether; shake the mixture; add 4 Gm. of ammonium chloride, shake well and frequently during half an hour; set aside for twelve hours for the morphine to separate. Counterbalance two small filters; place one within the other in a small funnel in such way that the triple fold of the inner filter is superposed upon the single fold of the outer filter; wet them with ether; remove the ethereal layer of the liquid in the bottle as completely as possible by means of a small pipette, transferring the liquid to the filter, rinse the bottle with 20 Cc. of ether, again transferring the ethereal layer by means of the pipette, to the filter; wash the filter with a total of 10 Cc. of ether, added slowly and in portions. Let the filter dry in the air, and pour upon it the contents of the bottle in portions, in such a way as to transfer the granular crystalline morphine as completely as possible to the filter. When all the liquid has passed through, wash the remainder of the morphine from the bottle with morphinated water until the whole has been removed. Wash the crystals with morphinated water until the washings are free from color; allow the filter to drain, and dry it, first by pressing between sheets of bibulous paper, afterwards at a temperature between 131° and 140° F. (55° and 60° C.) finally at 230° F. (110° C.) for two hours. Weigh the crystals in the inner filter, counterbalancing by the outer filter. Take 0.5 Gm. of the crystals and titrate with decinormal volumetric solution of sulphuric acid until the liquid, after boiling, slightly reddens blue litmus paper. 1 Cc. of this volumetric solution represents 0.0283 Gm. of pure anhydrous morphine. The weight of pure anhydrous morphine indicated by the titration, plus 0.104 Gm. (representing the average loss of morphine during the process) should amount in total to 1 Gm., that is to say, to a total of not less than 0.95 Gm., and not more than 1.05 Gm. corresponding to about 10 per cent. of anhydrous morphine in the dry powdered opium.

10. *Dutch Pharmacopœia.*

3.3 Gm. of the opium are triturated with about an equal weight of water, then 10 Cc. of water are added. The mixture is transferred into a weighed bottle. Ten Cc. of a freshly prepared mixture of calcium hydrate and water (1 = 20) are added and then sufficient water to make the contents weigh 35 Gm. The mixture is shaken repeatedly during three hours and then filtered through a folded filter of 4 Cm. diameter. Twenty Gm. of the filtrate, equal to 2 Gm. of the powdered opium, are mixed with 10 Cc. of ether, and 0.200 Gm. of ammonium chloride, shaken continuously during one-quarter of an hour, and then allowed to stand for 24 hours. Five Cc. of ether are then added and the ethereal liquid is filtered through a dry filter. To the aqueous liquid 5 Cc. more of ether are added, which are filtered also. Then the aqueous liquid is collected on the filter and the flask and filter washed with water until one drop of the filtrate does not color phenolphthalein solution. About 15 Cc. of water will be neces-

sary. The morphine on the filter and the morphine which remained in the flask are then dissolved in 20 Cc. of tenth-normal sulphuric acid, the acid solution filtered into another flask, the filter and flask washed well with water until the latter no longer shows an acid reaction, and the excess of acid, after the addition of five drops of hematoxylin solution, titrated back.

11. Japanese Pharmacopæia.

Introduce 10 Gm. of powdered opium with 4.5 Gm. of slaked lime into a glass bottle; add 100 Cc. of water, cork the bottle, and extract by shaking it strongly in the cold for two hours. Transfer the contents of the bottle to a piece of cloth placed over a filter-paper, and filter the liquid obtained by squeezing. Take 50 Cc. of the filtrate, together with 5 Cc. of alcohol, in a bottle, cork it tightly, shake and filter; mix 44 Cc. of this second filtrate with 20 Cc. of ether and 2.5 Gm. of ammonium chloride, in a suitable glass vessel which is to be stoppered; shake it strongly for half an hour and after setting aside for 24 hours, collect the precipitate produced upon a filter-paper previously dried and weighed, wash it with 10 Cc. of water and dry at a temperature not exceeding 60° C.; after cooling, wash the precipitate on the filter-paper again with 10 Cc. of pure ether, and after drying by heating first gently, and then at 96°–100° C. for about four hours, put into a dessicator, allow to cool, then the crystals should weigh 0.4–0.44 Gm.

12. Spanish Pharmacopæia.

Triturate in a mortar 15 Gm. of opium dried at 95° C. and mix with 8 Gm. of recently slaked lime. Place the mixture in a tared dish with 150 Gm. of distilled water and heat to a temperature of 50° to 60° C. for two hours, stirring from time to time and replacing the liquid which evaporates. Filter after cooling and collect 106 Cc. of the filtrate which correspond to 10 Gm. of opium. Place this in a flask and add 25 Cc. of ether and 3 Gm. of pure ammonium chloride. Shake carefully by rotating to avoid emulsions, allow to stand in a cool place for three hours or more and then decant the liquid. Add two more portions of ether, shaking and decanting each time. Having united the "ethereal" liquids* allow them to stand for twelve hours, at the end of which collect the precipitate formed on a small filter. Wash with 10 Cc. of distilled water and dry at a temperature not higher than 95° C. The morphine is afterward treated with chloroform to separate the narcotine and is again dried and weighed.

One Gm. of morphine should be obtained, but generally 0.92 to 0.94 Gm. are actually obtained, since losses of 0.06 to 0.08 Gm. can occur, due to imperfect precipitation and to washing.

* "Líquidos etéreos" in the original. This should evidently be "aqueous liquids," since morphine is insoluble in ether.

13. French Codex.

7½ Gm. of powdered opium, previously dried at 60° C., are mixed with 3 Gm. of finely powdered slaked lime, and to the mixture 25 Cc. of distilled water are added and stirred well until a uniform mixture is obtained. The mixture is then transferred to a glass-stoppered bottle of 125 Cc. capacity with 50 Cc. of water and mixed well by rotation. After two hours, with frequent rotation, the mixture is thrown on a filter of 14 Cm. diameter and 52 Cc. of the filtrate transferred to an Erlenmeyer of 125 Cc. capacity. Then 15 Cc. of ether are added, and, after mixing well 1 Gm. of pure ammonium chloride, and the mixture stirred well with a glass rod until crystals of morphine appear. The flask is then stoppered and allowed to stand for 24 hours after removing the glass rod. The ether is then filtered through counterpoised plain filters and 15 Cc. more of ether are added to the flask, the contents shaken, the ether filtered, and then the aqueous liquid. Then 8 Cc. of water saturated with morphine and ether are added to the crystals of the flask and the contents thrown on the filter. This latter filtrate, which is collected separately, is used for transferring the crystals in the flask as much as possible onto the filter, and the flask and funnel are washed with water saturated with morphine and ether, until the wash water does not produce any cloudiness with silver nitrate solution. The filters are then dried at 100° C. for about two hours, and after cooling, the crystals are washed three times with 8 Cc. of petroleum ether and dried again. After they are perfectly dry they are allowed to cool and the morphine is weighed. At least 0.5 Gm. and at most 0.55 Gm. of morphine should be obtained.

14. Italian Pharmacopœia.

10 Gm. of powdered opium previously dried at 60° C., are allowed to macerate for one hour, with frequent shaking, with 90 to 100 Cc. of a 20 per cent. solution of sodium chloride. The liquid is then decanted, allowing as much as possible of the opium to remain in the bottle. This is then macerated again with 60 Cc. of sodium chloride solution of the same strength and this process is repeated until the filtrate no longer gives a reaction for the morphine with Froehde's reagent. The combined solutions are then evaporated to dryness on a water-bath, the dry residue is extracted with boiling absolute alcohol, and the extraction repeated until no more morphine is taken up by the latter. The alcohol is distilled off and the residue taken up in 14 Cc. of water, with the aid of heat, and after cooling, sufficient ammonia water is added until the mixture smells distinctly of ammonia. The bottle is then stoppered and allowed to stand for 24 hours in a cool place, after which the precipitate is filtered on a tared filter and washed with water saturated with morphine until the filtrate becomes colorless. Filter and precipitate are then dried at 100° C. and the dry residue on the filter washed with chloroform or benzene,

until one drop of the filtrate evaporated and the residue taken up in hydrochloric acid gives no turbidity on the addition of sodium hydroxide solution. The residue and filter are dried at 100° C., and the former should weigh not less than 1 Gm.

NUX VOMICA.

1 U. S. P.

2. *German Pharmacopæia.*

15 Gm. of the powdered nux vomica, previously dried at 100° C., are shaken in a bottle with 100 Gm. of ether and 50 Gm. of chloroform, and then 10 Cc. of a mixture of two parts of caustic soda solution (15 per cent.) and one part of water are added and the mixture allowed to stand with frequent shaking for three hours. 15 Cc. or sufficient water are added until the powdered nux vomica after violent shaking balls together. After allowing to stand, 100 Gm. of the clear ethereal liquid are filtered through a dry well-covered filter and about $\frac{1}{2}$ of the ethereal liquid is evaporated. The remaining chloroform-ether solution is then transferred to a separator, the flask rinsed out three times with 5 Cc. each of a mixture of three parts of ether and one part of chloroform, and the combined ethereal liquids shaken well with 10 Cc. of tenth-normal hydrochloric acid. After perfect clearing, if necessary by the addition of so much ether that the ether-chloroform solution floats on the acid liquid, the latter is filtered through a small filter previously wetted with water into a 100-Cc. graduated flask. The ethereal solution is then shaken three times with 10 Cc. each of water, the aqueous solutions filtered through the same filter and the filter washed with sufficient water to make the total amount of liquid measure 100 Cc. Of this solution 50 Cc. are measured off and titrated in the usual way with iodeosin solution. Not more than 15.6 Cc. of $\frac{1}{100}$ normal caustic potash should be required to produce a pink color in the aqueous layer.

3. *Swiss Pharmacopæia.*

6 Gm. of powdered nux vomica are shaken for $\frac{1}{2}$ hour with 40 Gm. of chloroform and 80 Gm. of ether. Then 5 Cc. of ammonia water are added and the mixture allowed to stand 24 hours with frequent shaking. The ethereal liquid is filtered into a tared flask of 300 Cc. contents and the filtrate weighed. The menstruum is distilled off, the residue dissolved in 5 Cc. of absolute alcohol, and after solution has taken place, 10 Cc. of water, three drops of hematoxylin solution and 30 Cc. of ether are added and the mixture titrated with tenth-normal hydrochloric acid, until the aqueous liquid has assumed a red-brown coloration. Then the flask is shaken well and 30 Cc. more of water are added and the titration with acid continued until the aqueous liquid has assumed a lemon-yellow color after violent shaking.

For each 10 Gm. of the ethereal solution not less than .34 Cc. of tenth-normal hydrochloric acid should be used for neutralization.

4. *Dutch Pharmacopæia.*

It is directed that the nux vomica should first be exhausted with petroleum ether before the assay is made. 10 Gm. of the nux vomica, freed from fat, are mixed with 100 Cc. of chloroform and 10 Cc. of ammonia water and the mixture is shaken well for three hours. The chloroform solution is then filtered and the chloroform distilled off from 70 Cc. of the filtrate. The residue is dissolved in 3 Cc. of alcohol and mixed with 10 Cc. of tenth-normal hydrochloric acid, the acid solution is filtered through a wetted filter and the filter washed with water until the filtrate no longer gives a reaction for alkaloids. After the addition of 2 drops of hematoxylin solution the excess of acid is titrated back with tenth-normal caustic potash solution.

5. *Swedish Pharmacopæia.*

7½ Gm. of the powdered drug are transferred to a bottle of 200 to 300 Cc. capacity and mixed with 150 Cc. of a mixture of 4 volumes of ether and one volume of chloroform, and 10 Cc. of caustic potash, and shaken occasionally during one hour. Then 25 Cc. of water are added, and the mixture shaken until the powder balls together. After clearing, the ethereal liquid is filtered and 100 Cc. distilled until about 1 Cc. remains. This residue is mixed with 10 Cc. of $\frac{1}{10}$ normal hydrochloric acid and 25 Cc. of water and the balance of the chloroform evaporated. The acid liquid is then filtered into a bottle of 100 Cc. contents, the filter washed well, and the excess of acid titrated in the usual way with iodeosin as indicator.

6. *British Pharmacopæia.*

No assay process is given.

7. *Japanese Pharmacopæia.*

Mix 15 Gm. of nux vomica in medium powder dried at 100° C., with 139 Cc. of ether and 33.5 Cc. of chloroform, and shake strongly, add 10 Cc. of a mixture of 2 parts of sodium hydroxide solution and one part of water, and allow the mixture to stand, with frequent shaking, for three hours. Then add to the mixture 15 Cc. or more of water, and let the powder collect together by shaking strongly, and set aside for one hour. Filter 115 Cc. of the clear chloroform-ether solution into a small glass flask, through a dry filter paper placed in a well-covered funnel; distill the filtrate till it becomes about one-half of the original bulk; transfer the remaining chloroform-ether solution to a separating funnel, and wash the small flask thrice, each time with 5 Cc. of a mixture of 6 parts of ether and 1 part of chloroform; add the washings to the main solution in the separating funnel and shake the mixed liquid strongly with 10 Cc. of deci-

normal hydrochloric acid solution. After complete separation of the ether-chloroform solution, adding, if necessary, a suitable quantity of ether, filter the lower clear acid layer into a colorless glass flask of 100 Cc. capacity, through a small paper filter which is previously moistened with water; shake the chloroform-ether solution successively for three times, each with 10 Cc. of water, the aqueous layer being separated and filtered each time through the same filter-paper, which is finally washed with water; mix all the filtrates and dilute the mixture to 100 Cc. by adding water. Transfer 50 Cc. of the diluted solution to a colorless glass flask of about 200 Cc. capacity; add about 50 Cc. of water and some ether, until the latter forms in the bottle a layer of about 1 Cm. in thickness, and after adding five drops of iodeosin solution, titrate the excess of the acid in the resulting solution by pouring in drop by drop, centinormal potassium hydroxide solution, with strong shaking; then not more than 15.6 Cc. of the latter solution should be required, before the lower aqueous layer acquires a light red coloration.

8. *Spanish Pharmacopæia.*

No assay process is given.

9. *French Codex.*

Twelve Gm. of the powdered nux vomica, previously dried at 100° C., are mixed in a glass-stoppered bottle with 20 Cc. of chloroform and 100 Cc. of ether. Stopper the flask well and shake for five minutes. Then add 5 Cc. of a mixture of equal volumes of official ammonia water (20 per cent.) and distilled water. Shake frequently during three hours. Allow to clear, and filter 80 Cc. of the ether-chloroform liquid, equal to 8 Gm. of the drug, through a funnel covered with a glass plate. Transfer the ethereal liquid to a separator, and shake out with 25, 15 and 10 Cc. of a mixture of 2 Cc. of hydrochloric acid (33.6 per cent.) and 48 Cc. of water. Combine the acid solutions in another separator, add to it 50 Cc. of a mixture of ether and chloroform (no proportions given; probably a mixture similar to that used for extracting the drug. E.) and then an excess of dilute ammonia water, about 8 Cc., and shake well. Draw off the ammoniacal liquid into a second separator and shake out again with 50 Cc. of ether-chloroform mixture. Draw off the aqueous liquid and combine the ether-chloroform mixtures. Shake out with 2 Cc. of distilled water which is rejected; evaporate the chloroform-ether mixture in two portions in a flask of 90 Cc. capacity, dry the residue at 100° C. and weigh. By multiplying the weight by 12½ the percentage of alkaloids is obtained.

10. *Italian Pharmacopæia.*

Should contain 2½ per cent. of total alkaloids and is assayed in the following way: The powdered nut is first extracted with petroleum ether to

remove the fat. Six Gm. of the powdered nux vomica are transferred to a bottle of about 300 Cc. capacity and 100 Gm. of ether and 50 Gm. of chloroform are added, the mixture shaken well, and after the addition of 10 Cc. of ammonia water, shaken again well for five minutes. (No assay process for the drug is given. It is directed that the assay should be carried out by the process given for the extract. While five minutes' shaking is sufficient to liberate the alkaloids from the extract, this time is entirely insufficient to set the alkaloids free from the drug. The time should be extended to at least one-half hour. E.). The mixture is then allowed to clear, and the ethereal liquid is filtered through a small filter. From 100 Cc. of the filtrate the ether-chloroform is distilled off, and the residue taken up in 10 Cc. of tenth-normal sulphuric acid, applying gentle heat. The acid liquid is then filtered into a separator and the flask and filter washed three times with 3 Cc. of acid of the same strength, and finally twice with $2\frac{1}{2}$ Cc. of water. To the acid liquid $\frac{3}{4}$ of the above distillate of ether-chloroform and 5 Cc. of ammonia water are added, and the mixture shaken from 5 to 10 minutes and allowed to stand for one hour. The aqueous part is then separated and the ether-chloroform liquid shaken twice with $2\frac{1}{2}$ Cc. of water, which is rejected. The ethereal liquid is then filtered into a small tared flask, the separator washed with the remaining part of the ether-chloroform distillate, which is also filtered into the flask, the liquid evaporated, and the residue dried to constant weight.

11. *Hungarian Pharmacopæia.*

Nux Vomica should contain $2\frac{1}{2}$ per cent. of total alkaloids, which are determined in the following way: To 5 Gm. of the powdered drug 25 Gm. of chloroform and 50 Gm. of ether are added and after allowing to macerate for one-half hour 4 Cc. of ammonia water are added. The mixture is shaken well and continuously during one-quarter of an hour. After allowing to stand for one hour the ether-chloroform mixture is filtered and 60 Gm., equal to 4 Gm. of the drug, are transferred to an Erlenmeyer flask of 200 Cc. capacity.

The solution is then evaporated, the residue treated twice with 5 Cc. of ether, which is evaporated each time and then 30 Cc. of water saturated with ether are added and 10 Cc. of tenth-normal hydrochloric acid. After solution has taken place, the excess of acid is titrated in the usual way with iodeosin as indicator.

12. *Danish Pharmacopæia.*

15 Gm. of nux vomica, previously dried at 100° C., are mixed with 100 Gm. of ether and 50 Gm. of chloroform. The mixture is shaken well, 10 Cc. of sodium hydroxide solution are added, and shaken occasionally during three hours. Then 15 Cc. of water are added, and the mixture shaken well, to make the drug ball together. 100 Gm. of the ether-

chloroform solution are then filtered into an Erlenmeyer flask through a filter covered with a glass-plate, and one-half of the ether-chloroform solution is distilled. The remaining mixture is then transferred to a separatory funnel and the flask washed three times with 5 Cc. of a mixture of three parts of ether and one part of chloroform, which is also added to the separator. Then 10 Cc. of tenth-normal hydrochloric acid are added and the mixture shaken well. After clearing, if necessary, by the addition of some ether, the acid solution is filtered through a small filter into a 200 Cc. flask, and the ether-chloroform solution shaken out three times with 10 Cc. of water which is also added to the acid solution. The titration of the alkaloids is then carried out in the usual way, using iodesin as indicator.

13. Austrian Pharmacopæia.

6 Gm. of powdered nux vomica are mixed with 60 Gm. of a mixture of three parts of ether and one part of chloroform. After allowing to stand for one-half hour, 5 Cc. of ammonia water are added, the mixture is shaken well and then mixed with 10 Cc. of water and shaken well again. 50 Gm. of the clear ether-chloroform solution are filtered and then shaken out with 20-15-5 Cc. of dilute hydrochloric acid (0.5 to 100) and the combined acid solutions made alkaline with ammonia water and shaken out twice with 60 Gm. of ether-chloroform solution of the above composition. The ether-chloroform mixture is then distilled off, and the residue treated twice with a few Cc. of ether, which is evaporated also. The residue is then dried at 100° C. to constant weight.

14. Belgian Pharmacopæia.

15 Gm. of the powdered nux vomica are intimately mixed with sand and then exhausted with 70 per cent. alcohol. The alcoholic solution is evaporated until 10 Gm. of residue are obtained. The residue is acidulated with acetic acid and then extracted with ether. After the ether has separated, the aqueous liquid is mixed with 50 Gm. of ether and 25 Gm. of chloroform and shaken well. Then 5 Gm. of ammonia water are added, and the mixture shaken for a few minutes and allowed to stand for one hour. The supernatant liquid is then filtered, and 50 Gm. of the filtrate evaporated in a tared flask. The menstruum is then distilled off, to the residue 10 Gm. of ether are added, which is evaporated again, and the residue dried at 100° C. to constant weight.

CINCHONA.

1. U. S. P.

2. Austrian Pharmacopæia.

6 Gm. of powdered cinchona, previously dried at 100° C., are mixed with 60 Gm. of a mixture of three parts of ether and one part of chloro-

form, and after the addition of 3 Gm. of ammonia water and 10 Gm. of water, shaken frequently during twelve hours. Then gradually water is added (5 Gm. at the most) and 1 Gm. of gum tragacanth, the mixture shaken well, and allowed to stand for one hour. Fifty Gm. of the clear ethereal liquid are transferred to a separatory funnel and shaken out several times with a weak hydrochloric solution.

The combined acid solutions are then made alkaline with sodium hydroxide and shaken out with 20–10–5 Cc. of chloroform. Chloroform solution is collected in a tared flask, the chloroform distilled off, the residue dried at 100° C. and weighed.

3. *German Pharmacopœia.*

Twelve Gm. of the powdered cinchona, previously dried at 100° C., are mixed with 90 Gm. of ether and 30 Gm. of chloroform, and to the mixture 10 Cc. of caustic soda solution (15 per cent.) are added. With frequent shaking the mixture is allowed to stand for three hours. Then 10 Cc. or sufficient water is added and the mixture shaken until the powdered cinchona agglutinates, when it is allowed to stand until the chloroform-ether solution is perfectly clear. Then 100 Gm. of the clear ethereal solution are filtered through a well-covered filter into a flask, and about one-half of the ether-chloroform evaporated off. The remaining ether-chloroform solution is then transferred to a separator, the flask rinsed three times with 5 Cc. each of three parts of ether and one part of chloroform, and the combined liquids shaken well with 25 Cc. of tenth-normal hydrochloric acid. After perfect clearing, if necessary after the addition of sufficient ether to make the chloroform-ether solution float on the acid liquid, the latter is filtered into a 100-Cc. graduated flask through a small filter previously wetted with water. The ethereal liquid is then shaken out three times with 10 Cc. each of water. These aqueous extractions are filtered through the same filter, and the filter is washed with water until 100 Cc. of filtrate is obtained. Of this solution 50 Cc. are transferred to a bottle of 150 Cc. capacity mixed with a freshly prepared solution of a small piece of hematoxylin in 1 Cc. of alcohol and sufficient tenth-normal caustic potash is then added until the mixture has assumed a yellowish color, which turns to bluish violet on violent shaking. Not more than 4.3 Cc. of caustic alkali should be used for this purpose.

4. *Japanese Pharmacopœia.*

Mix 12 Gm. of the bark in fine powder, dried at 100° C., with 125 Cc. of ether and 25 Cc. of chloroform, and shake strongly; after adding to the mixture 10 Cc. of sodium hydroxide solution and setting aside for 3 hours with occasional strong shaking, let the powder collect together by adding 10 Cm., or still greater quantity of water and thoroughly shaking, and set aside for an hour; filter 125 Cm. of the clear chloroform-ether solution

into a small glass flask, by means of a well-covered funnel which is furnished with a dry filter-paper, and distill the filtrate till it becomes about half its original volume; put the remaining chloroform-ether solution into a separating-funnel, and wash the small flask 3 times, each with 5 Cc. of the mixture of 6 Cc. of ether and 1 Cc. of chloroform, and add the washing to the solution in the separating-funnel; shake the mixture strongly with 25 Cc. of decinormal hydrochloric acid solution, if necessary, with the addition of a suitable quantity of ether; when the layer of the chloroform-ether solution separates, take the lower, clear, acid layer, and filter it into a colorless glass flask of 100 Cc. in capacity, by means of a small filter-paper which is previously moistened with water; add 10 Cc. of water, successively for 3 times, to the chloroform-ether solution and shake, the aqueous layer being separated and filter, each time, through the same filter-paper which is finally washed with water, then mix the whole filtrates and washings, and make the mixture to 100 Cc. by adding water. To 50 Cc. of the solution thus prepared, add 1 Cc. of alcohol, in which a small piece of hematoxylin has been freshly dissolved, and titrate the resulting yellowish solution with decinormal potassium hydroxide solution, then not more than 4.3 Cc. of the latter solution should be required in order to color it immediately bluish-violet; and 5 Cc. of the solution left in the flask, after being mixed with 1 Cc. of chlorine water, should acquire a beautiful green color by adding ammonia water.

5. *Hungarian Pharmacopœia.*

2.5 Gm. of powdered cinchona bark are shaken with 15 Cc. of water and then mixed with 25 Gm. of chloroform and 50 Gm. of ether. 5 Cc. of fifth-normal caustic soda are added and the mixture shaken at intervals during $\frac{1}{2}$ hour. 60 Cc.* of the ethereal liquid (i. e. 2 Gm. of bark) are then filtered into an Erlenmeyer flask, the menstruum is evaporated and the residue is treated with 2 or 3 Cc. of ether which is evaporated also. The residue is then dissolved in 30 Cc. of alcohol and after the addition of one or two drops of lacmoid solution, tenth-normal hydrochloric acid is added until the blue color has changed to red. 3.8 to 4.0 Cc. of tenth-normal hydrochloric acid should be used.

6. *Swiss Pharmacopœia.*

2½ Gm. of cinchona bark are mixed in a flask of 200 Cc. capacity with 5 Cc. of diluted hydrochloric acid and 17 Cc. of water. The mixture is then heated for fifteen minutes on a steam-bath, and after cooling, 50 Gm. of ether and 25 Gm. of chloroform are added and the mixture shaken well. Then 4 Gm. of caustic potash solution (33⅓ per cent.) are added, the mixture shaken well for ten minutes, and after the addition of tragacanth, shaken again. The flask is allowed to stand for five minutes and

* Should read 60 Gm.

60 Gm. of the clear ether-chloroform solution is filtered through a pledget of cotton into a flask and the menstruum distilled off at once. The residue is treated three times with 5 Cc. of ether which is evaporated each time. Then the residue is dissolved with the aid of gentle heat in 10 Cc. of absolute alcohol, mixed with three drops of hematoxylin solution and 10 Cc. of water and titrated with tenth-normal hydrochloric acid until a red-brown color is obtained in the aqueous liquid. Then 30 Cc. more of water are added and the titration continued until a lemon-yellow color is produced. Not less than 4.3 Cc. of tenth-normal hydrochloric acid should be used.

7. *Dutch Pharmacopæia.*

6 Gm. of powdered cinchona bark are mixed with 2 Gm. of calcium hydrate and 90 Cc. of chloroform and 12 Cc. of ammonia water. The mixture is then shaken frequently for three hours and 75 Cc. of the chloroform, equal to 5 Gm. of powdered cinchona bark, are filtered and evaporated to dryness. The residue is dissolved in a few Cc. of alcohol and 20 Cc. of tenth-normal hydrochloric acid are added. The acid solution is filtered through a wetted filter, and flask and filter washed with small quantities of water until the filtrate has a neutral reaction. The total amount of filtrate should not exceed 100 Cc. The excess of acid is titrated back with tenth-normal alkali, using hematoxylin as an indicator. A persistent cloudiness shows the end of the reaction. Not more than 10 Cc. of caustic alkali should be used.

8. *Belgium Pharmacopæia.*

12 Gm. of powdered cinchona bark in No. 30 powder previously dried at 100° C., are then mixed in a bottle of 200 Cc. capacity with 180 Gm. of chloroform and 10 Cc. of ammonia water, and allowed to stand for three hours, shaking frequently and vigorously. Then 3 Gm. of gum tragacanth are added, followed by 20 Cc. of water. After strong shaking the mixture is rotated until the powder has balled together and the chloroform separated as a clear liquid. The mixture is then allowed to stand for one hour and the chloroformic liquid is filtered. The chloroform from 150 Gm. of the filtrate is distilled off, the residue dried, then dissolved in 20 Cc. of chloroform and the solution decanted in a separator. The flask is rinsed twice with 5 Cc. of chloroform and once with 60 Cc. of ether. Then 25 Cc. of tenth-normal hydrochloric acid are added and the mixture shaken well. After clearing, the aqueous liquid is filtered and the ether-chloroform solution washed three times with 10 Cc. of water which is also filtered. The combined acid liquids are then diluted with water to exactly 100 Cc. To 50 Cc. of this solution 1 Cc. of an alcoholic solution of hematoxylin is added, and then tenth-normal sodium hydrate solution until the yellow color changes to bluish-violet after strong shaking. The factor used for cinchona alkaloids is .0309.

9. Swedish Pharmacopæia.

7½ Gm. of powdered cinchona bark are transferred to a bottle of 200 to 300 Cc. capacity and shaken with 150 Cc. of ether. Then 10 Cc. of diluted caustic soda (2 parts of caustic soda solution and 3 parts of water) are added and the mixture shaken well for ½ hour. After the addition of water the mixture is shaken well, and after perfect clearing the ethereal liquid is filtered through a dry filter. 100 Cc. of the filtrate are distilled, the residue is taken up in 25 Cc. of tenth-normal hydrochloric acid, the mixture heated on a water-bath gently, and filtered after cooling. Flask and filter are then washed with water and the excess of acid titrated with tenth-normal caustic potash in the usual way, using hematoxylin as indicator.

10. British Pharmacopæia.

Mix 20 Gm. of red cinchona bark, in No. 60 powder, with 6 Gm. of calcium hydroxide, slightly moisten the powder with 20 Cc. of water; mix the whole intimately in a small porcelain dish or mortar; allow the mixture to stand for an hour or two, when it will present the character of a moist dark brown powder, in which there should be no lumps or visible white particles. Transfer this powder to a suitable flask fitted with a small reflux condenser, add 130 Cc. of benzolated amyl alcohol, boil them together for about half an hour, decant the liquid onto a filter, leaving the powder in the flask, add more of the benzolated amyl alcohol to the powder, boil and decant as before; repeat this operation a third time; then turn the contents of the flask onto the filter, and wash by percolation with more of the benzolated amyl alcohol until the bark is exhausted. Introduce the collected filtrate, while still warm, into a stoppered glass separator; add to it 2 Cc. of diluted hydrochloric acid, mixed with 12 Cc. of water; shake them well together, and when the acid liquid has separated this may be drawn off, and the process repeated with water slightly acidulated with hydrochloric acid, until the whole of the alkaloids have been removed. The Br. Ph. then directs the determination of the combined quinine and cinchonidine by precipitating the alkaloids with a solution of Rochelle salt. This was not carried out in these experiments, as comparative figures for the total alkaloids were desired. The acid solution, therefore, was made alkaline with ammonia and the alkaloids extracted by shaking out with chloroform. The chloroform solutions were combined in a tared Erlenmeyer flask, the chloroform evaporated and the residue dried to a constant weight.

11. Italian Pharmacopæia.

Ten Gm. of cinchona bark in a very fine powder are mixed with 12 Gm. of calcium hydrate and 100 Cc. of (90 per cent.) alcohol. The mixture is then heated to boiling for one hour in a flask provided with a condensing tube. After allowing to cool, sufficient alcohol is added to make

the total weight of the mixture 190 Gm. After shaking well, the liquid is allowed to clear and is then filtered. 100 Cc. of the filtrate, which has a sp. gr. of .84, representing 5 Gm. of the bark, are transferred to a porcelain dish, the measuring cylinder is washed three times with small amounts of alcohol which are also added to the dish, and after the addition of 20 Cc. of 1 per cent. sulphuric acid, the aqueous alcoholic liquid is evaporated until 10 Cc. of residue are obtained. After allowing to cool 10 Cc. of water are added and the mixture filtered into a separatory funnel, washing the bowl and filter with distilled water, which is also filtered into the separator, until one drop of the filtrate gives no reaction with picric acid. The solution in the separator is then shaken for ten minutes with 50 Cc. of chloroform after the addition of a 10 per cent. solution of sodium hydrate to produce an alkaline reaction, and the chloroform is transferred to a tared flask and distilled off. The aqueous liquid is then shaken out once more with the recovered chloroform, which is added to the residue in the flask. The menstruum is then distilled off and the residue dried at 110° C. to a constant weight.

12. *French Codex.*

Transfer to a glass-stoppered bottle of 1 liter capacity, 30 Gm. of cinchona bark previously dried at 100° C. Add to this a previously prepared mixture of 35 Cc. of ammonia water (20 per cent.) and sufficient alcohol to form a total volume of 180° C., shake well for one hour from time to time, and add 720 Cc. of ether, shake the well-stoppered bottle occasionally during six hours, then filter the ethereal liquid through a folded filter until 750 Cc. (equal to 25 Gm. of cinchona) are obtained. Distill off the ether in a convenient flask. After the ether is driven over, the distillation is continued until a part of the alcohol is distilled. The remaining liquid is then transferred to a flask of 125 Cc. capacity and the distillation is continued until no more liquid is left. The last traces of alcohol are then removed by placing the flask in boiling water. Dissolve the residue in a small quantity of water and 40 Cc. of dilute hydrochloric acid, by heating gently on a water-bath, and allow to cool. Filter the acid solution through a plain filter of 65 Mm. diameter into a separator of about 250 Cc. capacity. Wash the flask and filter completely with water and add the water to the filter. Add to the separator 125 Cc. of chloroform, then sufficient ammonia water to produce an alkaline reaction, or until the odor of ammonia is perceptible. Shake well and draw off the chloroformic solution into another separator. The ammoniacal liquid is treated twice with 125 Cc. each of chloroform. Wash the combined chloroformic solution by shaking with 10 Cc. of distilled water, which after separating is drawn off and rejected. The chloroformic solutions are then distilled until 200 Cc. of chloroform have distilled over. The remaining chloroform is transferred to a graduated flask of 250 Cc. capacity and the dis-

tilling flask washed with sufficient chloroform to obtain 250 Cc. of chloroform solution. After mixing well, 50 Cc. of this solution, corresponding to 5 Gm. of the cinchona, are transferred to a tared flask of about 90 Cc. contents, the chloroform distilled off, the residue dried at 100° C., and then weighed.

13. *Danish Pharmacopœia.*

25 Gm. of the powdered bark, 25 Gm. of alcohol, 15 Gm. of ammonia water and 200 Gm. of ether are mixed together, and the mixture is allowed to stand over night in a cool place with occasional shaking. 150 Gm., equal to 15½ Gm. of the bark, are then transferred to a flask and the ether distilled off. The alcoholic liquid is made strongly acid with normal sulphuric acid and after the addition of 20 Gm. of water the alcohol is evaporated off and the remainder filtered. The filtrate is divided in two equal parts; one part is made strongly alkaline with ammonium hydroxide and the separated alkaloids collected on a tared filter and dried at 100° C. to constant weight.

The quinine is determined in the other portion.

14. *Spanish Pharmacopœia.*

No assay process is given.

Comments.

By examining a sample of opium by the different methods, the following results were obtained, all calculated for morphine with water of crystallization. .

U. S. P.	{ 13.86 per cent. 13.95 per cent.	Pharm. Belg.	{ 12.2 per cent. 12.3 per cent.
Pharm. German.	{ 13.06 per cent. 12.82 per cent.	Pharm. Brit.	{ 12.35 per cent. 12.85 per cent.
Pharm. Danic.	{ 12.66 per cent. 12.82 per cent.	Pharm. Holl.	{ 12.99 per cent. 12.26 per cent.
Pharm. Helv.	{ 12.74 per cent. 12.47 per cent.	Pharm. Jap.	{ 12.37 per cent. 12.8 per cent.
Pharm. Hung.	{ 12.62 per cent. 12.25 per cent.	Pharm. Hisp.	{ 12.7 per cent. 12.25 per cent.
Pharm. Suec.	{ 12.35 per cent. 12.57 per cent.	French Codex.	{ 12.14 per cent. 13.38 per cent.
Pharm. Austr.	{ 12.4 per cent. 12.14 per cent.	Pharm. Ital.	{ 13.46 per cent. 11.33 per cent.
	{ 12.05 per cent.		

As will be seen from the above directions, the U. S. P., the German, Swiss, Swedish, Hungarian, Danish, Austrian and Belgian Pharmacopœias use only water for exhausting the opium and precipitate the morphine with ammonia water.

While in the U. S. P. no special provision is made for removing the narcotine, the German Pharmacopœia uses for this purpose a sodium salicylate solution, while the other pharmacopœias use normal ammonia water.

For holding the other alkaloids in solution, in most of the pharmacopœias alcohol-ether is used, but in the Swedish, Hungarian, Austrian and Belgian pharmacopœias, acetic ether.

The varying results obtained by the different methods, which in their fundamental idea are nearly all the same, depend largely upon the time allowed for the morphine to crystallize out. While the U. S. P., German and Danish pharmacopœias allow the mixture to stand for 24 hours, the Swedish, Austrian and Belgian pharmacopœias direct filtering at once, and the results therefore are correspondingly low. Similar results are obtained by the Swiss pharmacopœia, in which only $\frac{1}{2}$ hour is allowed and also by the Hungarian pharmacopœia, where 10 minutes are considered as sufficient for the morphine to crystallize out.

The high results obtained by the U. S. P. are apparently due to the thorough exhausting of the opium, to the longer time allowed for the morphine to crystallize out, and to the fact that the morphine is crystallized from a more concentrated solution. While in all the other pharmacopœias the proportion of the opium to menstruum is about 1 to 10, in the U. S. P. 3.4 parts of liquid represent one part of opium. The chances for the morphine to remain in solution are, therefore, less in the U. S. P. than in the other pharmacopœias.

The methods which depend on the exhaustion of opium by lime water, that is, by mixing the opium with slaked or unslaked lime and extracting this mixture with water, are the following: The British, Dutch, Japanese, Spanish pharmacopœias and the French Codex. In these methods it can also be noticed that when the morphine is allowed to crystallize for at least 16 hours, the results are considerably higher, than when only a short time is allowed for crystallization, as may be seen in the results obtained by the Spanish pharmacopœia. In all these methods also the proportion of opium to menstruum is about 1 : 10.

The low results obtained by the Dutch pharmacopœia cannot be explained. They may be due to the small amount of opium taken for the determination.

The comparatively high results obtained by the method of the French Codex are due to the impurities. The morphine obtained is of a rather dark color.

The most unsatisfactory method is that of the Italian pharmacopœia. The results are very low, and this is due to the fact that a part of the morphine is destroyed by evaporating the salt solution to dryness. We have noted at times that when an aqueous extract of opium is evaporated to dryness on a water-bath the amount of morphine is much lower than when the extract is evaporated only to a syrupy consistence. Besides giving low results, the morphine obtained by the Italian pharmacopœia method is of a very dark color, and cannot be purified even by prolonged washing with benzene.

In connection with the Pharmacopœia Japonica, it may be said that the wording given in this paper is the same as that given in the English edition of the Japanese pharmacopœia.

The method taken from the Spanish pharmacopœia is a close translation of the original text. Inasmuch, however, as the determination of morphine cannot be carried out in the manner prescribed, the method was modified on a more rational basis.

Nux Vomica.

The following results were obtained :

U. S. P.....	{ 2.59 per cent. 2.50 per cent.	Pharm. Helv.....	{ 2.41 per cent. 2.35 per cent.
Pharm. German.....	{ 2.53 per cent. 2.50 per cent.	Pharm. Jap.....	{ 2.49 per cent. 2.51 per cent.
French Codex.....	{ 2.05 per cent. 2.11 per cent.	Pharm. Suec.	{ 2.87 per cent. 2.79 per cent.
Pharm. Holl.....	{ 2.16 per cent. 2.23 per cent.	Pharm. Hung.....	{ 2.54 per cent. 2.46 per cent.
Pharm. Ital.....	{ 1.95 per cent. 1.91 per cent.	Pharm. Danic.....	{ 2.85 per cent. 2.87 per cent.
Pharm. Belg.	{ 2.47 per cent. 2.54 per cent.	Pharm. Austr.....	{ 2.04 per cent. 2.08 per cent.

No assay processes are given in the British and Spanish pharmacopœias.

In two of the pharmacopœias, the Dutch and Italian, it is directed that the nux vomica be previously deprived of its fat by extracting with petroleum ether. In all the pharmacopœias, mixtures of ether-chloroform in various proportions are used, and this accounts for the rather uniform results which were obtained by applying the different methods.

The comparatively low results obtained by the methods of the Austrian pharmacopœia and of the French Codex may be due to the fact that only two shakings are used for removing the alkaloids from the alkaline liquor.

The still lower results obtained by the method of the Italian pharmacopœia are caused by the use of only one shaking with ether-chloroform, which, as is well known, does not remove all the alkaloids.

The high results obtained by the Swedish and Danish pharmacopœias are due to the fact that it is impossible to obtain a clear filtrate of the ether-chloroform mixtures. Some of the caustic potash solution seems to go through the filter and consequently renders the results high. In all, six determinations were made, but high results obtained in each case.

The Belgian Pharmacopœia directs that the nux vomica be previously exhausted with 70 per cent. alcohol, and the resulting extract treated with ether-chloroform, etc.

Cinchona.

The following results were obtained :

U. S. P.....	{ 5.56 per cent.	Pharm. Belg.	{ 5.65 per cent.
	{ 5.3 per cent.		{ 5.8 per cent.
Pharm. Austr.....	{ 5.24 per cent.	Pharm. Suec.	{ 5.22 per cent.
	{ 5.35 per cent.		{ 5.27 per cent.
Pharm. German.....	{ 5.57 per cent.	Pharm. Brit.....(dark)	{ 5.1 per cent.
	{ 5.49 per cent.	Pharm. Ital.	{ 3.46 per cent.
Pharm. Jap.....	{ 3.76 per cent.		{ 3.62 per cent.
	{ 3.86 per cent.	French Codex.....	{ 5.044 per cent.
Pharm. Hung.....	{ 5.25 per cent.		{ 5.824 per cent.
	{ 5.35 per cent.	Pharm. Danic.	{ 5.11 per cent.
Pharm. Helv.....	{ 5.42 per cent.		{ 5.22 per cent.
	{ 5.48 per cent.		
Pharm. Holl.	{ 5.9 per cent.		
	{ 6.0 per cent.		

As will be seen from the foregoing, the methods of exhausting the bark vary considerably in the different pharmacopœias. The U. S. P. and the Austrian use ether, chloroform and ammonia, while the German, Japanese and Hungarian pharmacopœias use ether, chloroform and caustic soda. The Swiss pharmacopœia has adopted the well-known Fromme method of extracting the bark with acid, while the Dutch pharmacopœia uses chloroform, calcium hydroxide and ammonia, the Swedish pharmacopœia ether and caustic soda, the British pharmacopœia calcium hydrate and benzolated amyl alcohol, the Italian pharmacopœia calcium hydroxide and alcohol, and the Danish pharmacopœia and the French Codex alcohol, ether and ammonia.

The high results obtained by the Dutch and Belgian pharmacopœias are apparently due to the thorough exhaustion of the alkaloids by the use of chloroform, which is the best solvent for the cinchona alkaloids.

The acid extraction adopted by the Swiss pharmacopœia gives higher results than that of the U. S. P., when high grade barks are examined. In barks containing about 5 per cent. of alkaloids both methods give results nearly alike.

The large amount of Cinchona bark used by the French Codex is unnecessary, and should be reduced. The French Codex and the Danish pharmacopœia also direct that the quinine be determined, but this was not done; nor were the ether-soluble alkaloids determined as directed in the U. S. P., nor the mixture of quinine and cinchonidine as given in the British pharmacopœia. The mixture of total alkaloids obtained by the method of the latter is very dark, and this method without doubt is the worst of all, not only giving low results, but also on account of using amyl alcohol for the extraction.

The low results obtained by the method of the Japanese pharmacopœia are due to the fact that insufficient ether-chloroform is used to hold the alkaloids in solution.

The low results obtained by the process of the Italian pharmacopœia must be due to an insufficient exhaustion. Six experiments were made and invariably low results were obtained.

The low results of the process of the Danish pharmacopœia are due to the fact that a part of the alkaloids is retained in the alkaline liquid.

It is interesting to note that by the process of the Swedish pharmacopœia, in which only ether is used, such high results are obtained as reported. This can be explained by the fact that ether under normal conditions does not eliminate the cinchonine altogether, a fact which has been demonstrated in numerous experiments by the irregular results obtained by the U. S. P. method for determining the ether-soluble alkaloids.

THE CHAIRMAN: These two papers—the one by Mr. Lyons, and the other by Mess. Dohme and Engelhardt, are now before you for discussion. Are there any comments to be made, or questions asked?

MR. VANDERKLEED: I did not hear the earlier part of Mr. Lyon's remarks, but I agree with him as to the desirability of checking the chemical assay by means of the physiological test. I question very much, however, whether greater accuracy can be obtained by means of the physiological test of any kind, from the fact that different operators will report different results from the same preparation; and not only that, but different operators, under different conditions will report different results. So it is rather an unreliable method of checking up the chemical assay. After the symposium this afternoon, of physiological tests, I think that question can be brought up and perhaps discussed.

Then in regard to Mr. Dohme's paper, I would like to ask him about the use of C. P. Ether, instead of ether and water, whether he did not find it true that lower results were obtained?

MR. DOHME: I did, yes.

MR. STEVENS: Mr. Chairman, I always like to agree with my old friend Mr. Lyons, but there are occasional points where we must differ, and certainly one of them is on this aconite question. I have done considerable work upon this. I do not see how it is possible to give two methods in the Pharmacopœia for one preparation. If you do, which one are you going to depend upon? One or the other of those methods must be accepted as the standard. If you assay by the chemical method, and then you say you are going to check it by the physiological method, then why not do away with the chemical method and take your physiological method?

The physiological method is absolutely unreliable, as has just been pointed out, in the hands of different individuals. I have found advanced students, familiar with the taste of aconite, who would get fairly good results; whereas I found others who could hardly detect any effect from the same aconite even in one-fifth, or one-tenth strength of that which was reported by others. Then again, under different conditions the same individual will obtain different results.

And still further, I want to say in regard to the application of the chemical test to the drug, that I have obtained drugs under all sorts of conditions as to age and some so worm-eaten that the tubers would not hold together, yet the variation in age could be told by the chemical test. In case heat is used there is no doubt a change that will give high results by the chemical assay method, even after the physiological results have disappeared, but preparations of aconite are no longer made by heat.

Now then, I want to say a little something on that old bugbear question, the Opium Assay. Mr. Lyons has pointed out one of the principal objections to the use of the lime assay, for the assay of opium, and that is the aliquot part. I think we all recognize that we would like to do away with the aliquot part wherever it is possible to do so. He was also kind enough to state that, after all, it did not influence the results more than

about a fifth of one per cent. in the final result; so that does not stand in the way very much. In the lime method we are dealing with an aqueous solution in which there is very little loss. On the other hand, it has been used quite extensively in preparations where we use a volatile liquid like ether, chloroform and alcohol, and mixtures of these, where there is not only rapid evaporation, but where there is concentration, or condensation.

There was another question he brought up—in regard to the removal of the crystals, in using counterpoise filters. Wherever filters are counterpoised, and used dried before weighing, you will find that invariably the outer filter will contain impurities which have been carried to the surface by evaporation. That is a fact that has been pointed out years ago in the manufacture of certain preparations. J. U. Lloyd stated, that in drying crystals, he preferred to hang them up, and not spread them out, and let them dry, so the impurities would come to the outside. I have not made experiments to prove it—but I am inclined to think the error introduced by the use of counterpoised filters will be greater than by removing the crystals as in the opium assay.

In regard to determining the impurities in the morphine by the pharmacopœia method, Dr. Lyons spoke of that and I thought he covered it very nicely, but I want to emphasize it. You will find that lime water will dissolve a lot of impurities. The test was introduced solely for the purpose of determining the purity of the morphine, with the idea of dissolving out the morphine and leaving the impurities on the filter. Take morphine as you find it in the pharmacopœia method, where the result gives you a dark colored residue of morphine, treat it with lime water and you will find that a great deal of that colored matter will be dissolved with the morphine. I saved the filtrates in a few cases, and afterwards evaporated them down to dryness, and found a very fine, dark residue, which could not be due to lime, or morphine. It is a well known fact, I think, to those who assay opium, that the color is no criterion of the purity of morphine in the assay by the pharmacopœia method. Those who have worked on the U. S. P. revision committee remember one sample that gave the largest amount of impurities of any assay we obtained by the pharmacopœia method, and yet it was almost white. It is very often the case that the very whitest morphine residue you get is apt to be the least pure, because it consists of impurities which are colorless.

THE CHAIRMAN: I want to call attention to the fact again, that a general meeting has been called for 12 o'clock, and we have been requested to adjourn early, so if members will make their remarks brief and to the point, it will enable us to get through by the time the general meeting is held.

MR. LYONS: I have just a few words to say. Of course, when I say that with our present knowledge of the subject, it is not right for us to accept unqualifiedly the results of chemical assays in aconite, how shall we check the result? It is right for us in any case to attempt to show the purity or impurity of our product. Some method of checking by physiological test is certainly justifiable. It does not give you two standards; it simply says that although your chemical assay has given you what the Pharmacopœia requires as a standard, the physiological test has not.

I wish to say a word on some of the processes of other pharmacopœias. Most of the new assay processes follow the German Pharmacopœia in attempting to get rid of the objectionable impurities in the morphine, by first adding a very small amount of ammonia, which precipitates at once that impurity, filtering rapidly, and then adding a larger amount of ammonia.

I should like to have the point especially brought out, if possible, in Mr. Dohme's paper, whether in processes in which that method is used, lower results or practically the same results are obtained. From what I have seen, myself, the results seem to be a

little bit lower, and yet not so much so as to cause us to reject the process, except that in inexperienced hands we are liable to get some losses of morphine.

MR. DOHME: In reply to Mr. Lyons I would say those processes all give lower results, but only about two-tenths per cent., which was probably within the range of error, I should say, and seemed to indicate that it did not make as much difference as we expected; but I agree with Mr. Lyons that it is a dangerous thing to introduce for general use, because it is liable in some hands to give very discordant results. I am very glad Mr. Lyons made the last remarks he did, because I think they prove what I said before. He simply uses his physiological test for quality and not quantity; then if the drugs are spoiled by age, what is the value of the physiological test?

THE CHAIRMAN: When we opened this meeting, we were without a quorum. I see that we now have a quorum present, and it is a good time for us to vote for officers.

The following named gentlemen were placed in nomination, and on motion, the nominations closed, and the unanimous vote of the Section cast for their election, namely: Mr. A. H. Clark, of Chicago, Chairman; Mr. William O. Richtmann, of Satsuma Heights, Fla., Secretary.

THE CHAIRMAN: Unfortunately, some of the papers for this morning came in too late to be printed. The next paper on the program would be of infinitely more interest to you if it were printed, and as Dr. Seidell is not here, I think we had better pass the paper, reading it by title only, and proceed. The paper is entitled *The Distribution of Alkaloids between Immiscible Solvents, and its Bearing upon Assay Processes*.

THE CHAIRMAN: The next paper we have is by Mr. A. H. Clark, on the U. S. P. *Methods of Assay of Belladonna Extracts and Belladonna Plasters*.

Mr. Clark here read his paper as follows:

ON THE ASSAY OF BELLADONNA PLASTER AND EXTRACT OF BELLADONNA.

A FEW CRITICISMS AND SUGGESTIONS.

A. H. CLARK.

In attempting to assay belladonna plaster of commerce, following strictly the directions of the U. S. P., I met with some serious difficulties and found that certain modifications of the process laid down there would greatly facilitate the work of assay and bring about more uniform results.

In view of the coming revision of the Pharmacopœia I offer these criticisms and suggestions in the hope that they will aid in working out a more satisfactory assay method than that now official.

Before entering on the discussion of these points I wish to say that the method of the U. S. P. was tried upon plasters prepared by myself from start to finish, belladonna extract, lead plaster and all, and to my surprise I found that the method could not be applied. The lead plaster dissolves in the chloroform, and some of it, at least, remains until the sulphuric acid is added in the shaking out of the alkaloid, and is then decomposed, the fatty acids separating and floating on top or partly emulsifying, and the lead precipitating as lead sulphate, all of which results in a mixture from which

it is practically impossible to separate the acid solution. There being no lead plaster in the commercial article, these objections do not hold good.

The first objection to the U. S. P. process I found to be in the directions to add the plaster to a suitable beaker containing 25 Cc. chloroform and 3 Cc. ammonia water. When this is done the ammonia water is immediately absorbed, in part at least, by the cloth of the plaster and renders the subsequent removal of the plaster extremely difficult, a greatly increased quantity of chloroform being necessary to complete the washing, and even then the cloth is highly colored and contains quite a large amount of the plaster.

If the directions to continue the washings with chloroform, adding 1 Cc. ammonia water, are followed, 4 Cc. ammonia water will be carried into the separator. This amount of ammonia water will require about 23 Cc. of normal sulphuric acid to neutralize it. It is obvious, then, that there will be required of the mixture directed (normal sulphuric acid 40 Cc. and water 60 Cc.) about 60 Cc. before the ammonia water is neutralized. One might extract with 20, 10, 10, etc., Cc. of the mixture, test the fourth or even the fifth extraction as directed with Mayer's solution, and find no alkaloid, not, however, because it was all extracted in the first portions, but because the solution is still alkaline.

The directions to test with Mayer's reagent are objectionable because of the alcohol which necessarily is carried along in the extraction, and which inhibits the delicacy of the test. This objection holds good with Wagner's reagent also, but I prefer the latter, as it seems to me, under the circumstances, to be more sensitive.

The remaining directions of the U. S. P. seem to be very satisfactory.

To overcome the directions mentioned above I have adopted the following procedure :

Take about 10 Gm. of the plaster (one commercial plaster weighs this), after removal of the thin gauze from the face of the plaster as well as the large protecting sheet from the back, cut it into four equal parts, and these again into strips about one quarter inch wide. Place it in an Erlenmeyer flask of about 100-Cc. capacity, which is fitted with a good cork. Add 25 Cc. chloroform and shake gently for two or three minutes. Decant the chloroform solution into a second Erlenmeyer flask of about 250 Cc. capacity, fitted with a good cork. Repeat the washing of the cloth with another portion of chloroform of 25 Cc. and decant to the large flask as before. Continue the extraction of the cloth with portions of chloroform of 10 Cc. each until 100 Cc. in all have been used. To 80 Cc. of alcohol add 2 Cc. ammonia water and wash the cloth with this mixture in portions of 10 Cc. each, adding the washings to the large flask each time and shaking well after each addition. Allow the flask to stand a few minutes and decant the clear liquid to a separator of 250 Cc. capacity and wash the flask and precipitated rubber with several small portions of alcohol.

using in all about 15 Cc. To the separator add 20 Cc. normal sulphuric acid and shake thoroughly. After complete separation draw the lower chloroformic layer into a beaker and filter the acid liquid through a small plug of cotton into a second separator of about 150 Cc. capacity. Return the chloroformic solution to the first separator, repeat the shaking out with a mixture of 5 Cc. normal sulphuric acid and 10 Cc. water, collecting the acid liquid in the second separator as before. Repeat the extraction in the same manner until a portion of the acid liquid does not precipitate with Wagner's reagent, even on standing 10 minutes. Render the acid liquid in the second separator alkaline with ammonia water and extract the alkaloids with four successive portions of chloroform of 25, 15, 10, 10 Cc. each, filtering each portion through a small plug of cotton into a beaker. Evaporate the chloroform by aid of a gentle heat, and to the residue add a slight excess tenth-normal sulphuric acid (from 2 to 2.5 Cc.), noting the exact amount. To the residue add 10 drops chloroform, and after all has dissolved expel the chloroform by aid of a gentle heat. Add 5 drops cochineal T. S. and determine the excess of acid with fiftieth-normal potassium hydroxide V. S. Divide the Cc. of fiftieth-normal potassium hydroxide V. S. by five, subtract this quotient from the Cc. tenth-normal acid added, multiply the difference by 0.0287 and divide this product by the weight of plaster removed from the cloth. The quotient multiplied by one hundred gives the per cent. mydriatic alkaloids in the plaster.

After washing the cloth as directed, it is placed in a tared weighing bottle and dried at 100° C. and its weight subtracted from the original weight taken. The remainder is the weight of plaster on the cloth.

This procedure gives a cloth that is perfectly white and weighs an amount appreciably less than when treated by the U. S. P. method. The weight of the cloth varies but little, twenty-five recent assays giving an average weight of 2.997 Gm., the highest weight being 3.0560 and the lowest being 2.9083 Gm. If a plaster weighs ten Gm., a variation of 0.5000 Gm. in the weight of the cloth means a difference of about eight per cent. in the amount of alkaloid found. This might be the cause of considerable error in the final report on the assay of belladonna plaster.

BELLADONNA EXTRACT.

In the assay of extract of belladonna the directions of the U. S. P. to dissolve the extract in a mixture of alcohol, water, ammonia water and chloroform, if followed literally, result in a very bad mixture. The chloroform being heavier than the other liquids settles to the bottom of the beaker and surrounds the extract which it does not dissolve, and vigorous and long-continued stirring is necessary to bring the extract in contact with the water, and alcohol mixture sufficiently to dissolve it. To overcome this objection, I have proceeded, as follows:

To the belladonna extract contained in a suitable beaker add 15 Cc. of

a mixture of alcohol and water, two to one by volume, and warm the mixture gently on a water bath, stirring until completely dissolved. Transfer the mixture to a separator and rinse the beaker with 10 Cc. of the alcohol and water mixture added in small portions at a time. Transfer these washings to the separator and add also 2 Cc. ammonia water. The procedure from here on is the same as that directed in the U. S. P.

In commercial extract of belladonna root and possibly of scopolia root it is convenient to increase the volume of the alcohol and water mixture in which the extract is dissolved and also the volume of chloroform to prevent the formation of troublesome emulsions.

University of Illinois School of Pharmacy, Chicago, Ill.

MR. PUCKNER: Mr. Chairman, the paper I think has brought out one point very prominently: the greater need, apparently, of describing the assay processes in the Pharmacopœia. The wording for the assay of the extract of belladonna, as it was submitted to the proximate Assay Committee, merely stated that alcohol, chloroform and water would be used to dissolve the extract and transfer it to the separator. It was presumed that those who use the processes would know how to use these solvents to effect that transfer. Later, in wording the method for the Pharmacopœia it was worded in such a way as to mislead those who tried to follow the processes accurately. The same thing applies to the assay of the belladonna plaster, where the amount of acid is barely sufficient to neutralize the ammonia. The intention, of course, was to use that acid first to neutralize the ammonia and then complete the extraction with the water that was left over. It seems to me as these Pharmacopœia methods must be followed accurately, it is necessary, in order to avoid different results, that the details must be made more explicit.

MR. VANDERKLEED: It seems to me that it will never be possible in the Pharmacopœia to give explicit directions for carrying out an assay which will in different hands yield exactly concordant results. I think one of the troubles in the Pharmacopœia is that we try to give too explicit directions, and do not give enough leeway. What we need more particularly is a very good series of general directions on assays, to apply to all of them, and leave many of the details to individuals.

MR. KEBLER: I would simply say that if we had plenty of men in this country who were experts, or who were qualified to apply these methods based on general directions, I think that would be very well; but even with the details that we now have, granting that some of them are a little off-color, the results are far from concordant; and as I will try and bring out in a paper subsequently, what to me seems important is to have the methods given in detail as far as possible, and instruct the man that does the work to follow those details, and not let him exercise his own ingenuity, as that, in my opinion, is what causes the trouble.

MR. LYONS: The paper is a very valuable one; not in itself, that is, not because the subject of assay is a particularly important one, but because it develops a weakness of a number of our assay processes in the Pharmacopœia, in which the directions have failed to be perfectly explicit. It emphasizes what I have laid down here as one of the general principles, in the paper I have read, that we should have in the Appendix of the Pharmacopœia, very detailed and explicit directions for the general method of alkaloid assays. That will do away with many of these difficulties.

THE CHAIRMAN: The next paper is by Mr. Kebler, and before taking that up I would

like to call attention again to the fact that it is now ten minutes to 12, and we have been requested to adjourn promptly at that hour, so as to give members who desire to do so, an opportunity to attend the general session. I do not, myself, think it is fair that those who do not care to attend the general session should be deprived of continuing with this meeting, and so I will entertain a motion that we remain in session until we dispose of our morning's program.

MR. STEVENS I do not think it requires any formal motion; of course any one who desires to attend the general session will feel at liberty to withdraw at any time he sees fit.

THE CHAIRMAN: I would state that we have had permission from our Council to continue the session until we are through, and those of you who wish to attend the general session will please remember that it meets at 12 o'clock.

MR. KEBLER here presented his paper on "The Present Status of Drug Assaying."

THE PRESENT STATUS OF DRUG ASSAYING.

BY LYMAN F. KEBLER, CHIEF DRUG DIVISION DEPARTMENT OF AGRICULTURE.

In 1905 in a paper entitled "Outlines for the Sampling of Drugs and Chemicals" I called attention to the importance and value of procuring average representative samples before undertaking a chemical investigation. Extended observations since that time confirm the views expressed in that paper, both as to methods of sampling and the imperative necessity of securing representative samples.

During the past few years we have been called upon to apply the pharmacopœial and other methods of analysis to commodities imported into the United States and subject to interstate commerce. In many instances the samples under investigation represented transactions of considerable magnitude. Importers and dealers did not as a rule submit without protest and verification to some of our findings. So far, however, our results have stood the test. I recall only a single exception where there was a material difference between the findings of the Bureau of Chemistry and the results obtained by the chemist of the importer, and that was in favor of the commodity, that is, the first results were higher than the average of a more extended examination. The goods were released on the first findings. The importer, however, was annoyed because of the fact that a more extended examination of the commodity showed that on the whole the alkaloidal content of the material was below the standard. It was his desire on this ground to have the Department take adverse action and exclude the importation. The findings, however, had been reported, the goods released, and it was therefore impossible to comply with the request.

The above, however, does not mean that the results of the Bureau of Chemistry and the chemist for the importers are always in concordance. In fact, it is almost always necessary to allow for certain variations. On the whole, however, the results obtained by the present pharmacopœial

methods for determining the various alkaloidal constituents present in potent drugs are fairly satisfactory, considering all of the disturbing factors encountered.

The question naturally arises as to the permissible variation in analytical work of this character. It must be stated in the outset that it is impossible to draw a hard or sharp line of demarcation for any commodity. It is always necessary to take into consideration the nature of the article, the character of the goods, and other factors that may arise.

During the past six years the Association of Official Agricultural Chemists has through a referee, who has been and now is the Chief of the Drug Division, continued a series of co-operative investigations along certain lines. These results have been published in the "Proceedings" of the Association of Official Agricultural Chemists, and serve as a basis for arriving at reasonable variations obtained by workers conducting their analyses in different sections of the country. It is a well-known fact that two or more chemists working side by side or under the same management obtain more concordant and uniform results than those working separately and apart from one another; for example, Dr. LaWall and myself, during a number of years working side by side, frequently checked each other's findings with the result that as a rule there was very little difference, but if a portion of the same article was examined by a chemist located in some other laboratory, his findings frequently varied materially from our results.

In order to arrive at some conclusion as to the variation that should be permitted on results obtained by various workers on different commodities, I have carefully studied the co-operative results obtained and published since the year 1906. The first extensive co-operation work in pharmaceutical products of the character under consideration, to my knowledge, was undertaken by a committee on indicators of this Association in 1905, and continued for the years 1906 and 1907. From the title it can readily be seen that the chief purpose of the investigation was not for the purpose of determining the amount of variation obtained by the several workers, but a test of the value of the several indicators. This in itself makes the work of even more value. In order to arrive at fair results, it is usually necessary to make duplicate analysis and report the average findings. From this it can readily be seen that there is always an upper and lower factor. In order to provide for this it has been our practice to allow variation above and below the average; for example, if a number of observers report certain figures on a sample of opium and the total variation between the maximum and minimum is 10 per cent., based on the average, the variation would be 5 per cent. above and 5 per cent. below this average. In practice it has been found that this sliding scale, as it may be called, works very satisfactorily. By applying this method to the results published by the committee on indicators, it will be found that

when the examinations were restricted to pure material, viz., the alkaloids of atropine, brucine, morphine, and strychnine, the variation from the average did not exceed $2\frac{1}{2}$ per cent. The same also holds true to determining the per cent. of pure morphine present in crude morphine by titration.

In the case of ipecac one set of workers reported results which very nearly came within a 5 per cent. variation. In another set of results, however, the variation amounted to approximately 10 per cent. The variation of the results obtained in another line of experiments by certain workers is approximately 10 per cent., but the subsequent year the variation is as high as 15 per cent.

In the case of nux vomica the variation in three different reports was less than 10 per cent., and in two other reports it exceeds slightly 15 per cent., while in two additional reports the variation reaches almost 20 per cent.

In the case of coca and belladonna leaves the variation is as high as 35 per cent., a range which is entirely too great.

A review of the work done by the Association of Official Agricultural Chemists shows a variation for opium based on table 1 of 5 per cent.; table 2, $7\frac{1}{2}$ per cent.; table 3, 5 per cent.; table 4, $7\frac{1}{2}$ per cent.; table 5, 5 per cent.; table 6, $7\frac{1}{2}$ per cent.; table 7, 5 per cent.; table 8, variations between 5 per cent. and 10 per cent. In the case of cinchona, table 9, the variation is 15 per cent., and ipecac and nux vomica are 10 per cent.; the variation for aconite leaves by the Pharmacopœial method is 25 per cent.; for the same drug by another method, $7\frac{1}{2}$ per cent.; aconite root, 20 per cent. by the Pharmacopœial method and 25 per cent. by another method based on aliquot parts; belladonna leaves by Pharmacopœial method, 20 per cent.; by another method based on aliquot parts, 10 per cent.; belladonna root, by Pharmacopœial method, 15 per cent.; by a second method based on aliquot parts, 5 per cent. In the case of cinchona (yellow) by the same table the variation for total alkaloids by the Pharmacopœial method was less than 1 per cent. The ether-soluble alkaloid, however, by the same method is 15 per cent.; the total alkaloids determined by a second method varied slightly over 10 per cent., whereas the ether-soluble alkaloidal variation was less than 1 per cent. In the case of red cinchona the story is about the same. Coca leaves, variation by both methods is approximately 25 per cent. Colchicum corm, Pharmacopœial method, varies nearly 25 per cent.; determinations made by a second method show a variation of less than $7\frac{1}{2}$ per cent. In the case of colchicum seed the variation for the Pharmacopœial method was slightly less than 25 per cent., but the variation with a second method was over 50 per cent.

I have also made a careful study of the results obtained by the Pharmacopœial sub-committee on assaying. I present them below without comment, allowing each reader to make his own deductions.

The Scientific Section voted that the data based on the results of the pharmacopœial sub-committee on assaying be not printed in the Proceedings. To this I protested and herewith renew my protest, for the following reasons :

(1) The Chairman of the Revision Committee authorized me to make such use of the data of the sub-committee on assaying as I desired.

(2) I am opposed to concealing any known material facts dealing with chemical problems. It is of course within the experience of all that the truth at times hurts, but it is such hurts that stimulate us to greater activity in eliminating the offenders. It has been my policy at all hearings, legal and otherwise, to plainly set forth the limitation of certain chemical problems, and I have yet to see a case where either chemistry or justice has suffered. Publicity, in my opinion, is the best means of correcting defects and shortcomings. I can only say, with the poet, "Truth crushed to earth will rise again."

(3) Some of the members (I recall Drs. Dohme and Lyons) of the sub-committee have published such data of the sub-committee as suited their purpose. I do not believe in such garbled publications. Let the whole become public property. Dr. Dohme (1) published certain results to show why certain methods were introduced into the Pharmacopœia and (2) Dr. Lyons drew on the same data to show what greatly varying results were obtained by the same method in the hands of experimental pharmaceutical chemists. When I called this matter to Dr. Lyons' attention he said : "Yes, but the figures I published do not show such a great variation as some of the data used by you." The figures published by Dr. Lyons show a variation of about 150 per cent. or a variation of about 75 per cent. from an average. It is true the data used by me show a greater variation than the above, but in connection with this I only want to say that when a variation in analytical data exceeds 20 per cent. from an average it might just as well vary 1000 per cent. so far as concerns their practical utility. I cannot fathom the frame of mind of any member of the sub-committee on assaying who is opposed to the publication of any or all of the data obtained in its work and particularly is this true of the members who have themselves published part of such data.

Experience shows that careful analysts can readily come within an upper and a lower percentage variation as indicated below :

2.5 per cent. Atropine, Brucine, Morphine, Strychnine, Cocaine, Nicotine.

5 per cent. Ipecac, Opium, Jalap Root.

10 per cent. Nux Vomica, Coca Leaves, Belladonna Root, Cinchona Bark (total alkaloids), Hydrastis, Stramonium, Guarana, Kola, Cinchona Bark (ether soluble alkaloid), Colchicum, Sanguinaria.

15 per cent. Aconite, both leaves and root, Belladonna leaves, Pilocarpus, Conium, Physostigma.

20 per cent. Henbane.

TABLE I.—RESULTS OF COOPERATIVE WORK ON OPIUM, METHOD I, UNITED STATES PHARMACOPOEIA, 1890, WITH ADDITIONS.

NAME.	Amount of morphine on filter paper.	Average.	Amount of morphine on watch glass.	Average.	Purity by acid titration.	Purity by KOH or Lyons's method.	Purity by lime water.	Morphine in opium by acid titration. ^a	Morphine in opium by KOH or Lyons's method. ^a	Morphine in opium by lime water. ^a	Moisture in morphine at 110° C.
	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
Blome	13.56	13.59	13.46	13.477	96.916	92.22	94.76	13.06	12.43	12.71	5.5
Do	13.63		13.495								
Do	14.76		14.70								
Do	14.85	14.80	14.80	14.75	94.94	90.47	85.86	14.00	13.34	12.66	5.92
Dohme	13.59	13.47	13.36	13.30	98.64	94.83	95.98	13.12	12.61	12.77	6.8
Do	13.36		13.24								
Do	13.66	13.64	13.49	13.46	98.41	95.22	94.60	13.25	12.92	12.73	6.53
Do	13.64		13.44								
Doolittle	9.786	9.75	9.69	9.64	98.55	98.61					6.64
Do	9.715		9.60								
Havenhill	14.31	13.97	14.305	13.917	96.91	93.16	91.80	13.49	12.96	12.78	6.74
Do	13.63		13.53								
Do	14.24	14.097	14.12	13.99	98.91	93.16	91.80	13.56	13.03	12.84	6.74
Do	13.955		13.87								
Kebler	13.61	13.55	13.50	13.43	96.60	91.98	94.60	12.97	12.36	12.70	7.06
Do	13.50		13.37								
Do	13.54	13.51	13.45	13.41	97.00	93.08	96.64	13.01	12.48	12.96	6.90
Do	13.48		13.36								
Lyons	13.81	13.77	13.68	13.64	97.91	93.57	95.65	13.35	12.76	13.05	6.6
Do	13.74		13.61								
Mallinckrodt Chemical Works	14.36	14.30	14.19	14.25	94.41	91.03	89.20	13.45	12.97	12.71	6.6
Do	14.24		14.31								
Do	13.78	14.01	13.73	13.96	97.36	92.63	92.10	13.59	12.93	12.86	6.96
Do	14.25		14.19								
Puckner	13.70	13.52	13.47	13.21	97.11	92.41	94.49	12.83	12.21	12.54	.....
Do	13.35		12.95		96.37	91.39	89.60	12.73	12.07	11.84	.....
Do	13.90	14.16	13.83	14.09	96.50	92.92	91.44	13.60	13.09	12.88	6.88
Do	14.42		14.35		96.64	93.84	86.33	13.62	13.22	12.16	7.07
Ruddiman	14.21	14.09	14.09	14.04	97.32	88.53		13.66	12.43	.....	7.10
Do	13.98		14.00								
Do	14.30	14.25	14.24	14.20	96.41	88.53	91.30	13.69	12.57	12.96	7.06
Do	14.21		14.16								
Smith	14.58	14.62	14.50	14.55	96.42	97.02	96.00	14.03	14.12	13.97	6.06
Do	14.67		14.60								
Do	14.59	14.62	14.53	14.58	96.41	97.02	95.90	14.06	14.15	13.98	6.10
Do	14.66		14.63								
Average .....	.....	13.85	.....	13.74	96.99	93.22	93.04	13.31	12.68	12.70	6.62
Maximum ..	14.42	14.30	14.35	14.25	98.64	98.61	96.64	13.69	13.22	13.05	7.10
Minimum ..	13.35	13.47	12.95	13.21	94.41	88.53	86.33	12.73	12.07	11.84	5.50
Difference ..	1.07	.83	1.40	1.04	4.23	10.08	10.31	1.96	1.15	1.21	1.60
Per ct. var. .	7.7	6.2	10.1	7.5	4.3	10.8	11.8	1.7	0.9	0.95	24.2

^a Based on per cent. of morphine weighed on watch glass.

^b Stood twenty-four hours before separating morphine.

^c Not included in average, maximum and minimum.

^d Results obtained by mixing morphine of both sets of duplicates.

^e Acid standardized against morphine.

^f Per cent. of morphine by Mallinckrodt's method, 12.92.

^g Used porcelain gooch crucible, provided with paper disk, all dried to constant weight.

TABLE II.—RESULTS OF COOPERATIVE WORK ON OPIUM, METHOD II, UNITED STATES PHARMACOPŒIA, 1880, MODIFIED.

NAME.	Amount of morphine on filter.	Average.	Amount of morphine on watch glass.	Average.	Purity by acid titration.	Purity by KOH, or Lyons's method.	Purity by lime water.	Morphine in opium by acid titration. ^a	Morphine in opium by KOH, or Lyons's method. ^a	Morphine in opium by lime water. ^a	Moisture in morphine at 110° C.
	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Pec ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
Blome	11.698		11.59								
Do	11.523	11.61	11.435	11.512	98.00	97.12	93.4	11.05	11.18	10.75	6.46
Do	11.70	11.70	11.60	11.60	98.206	98.03	99.37	11.39	11.37	11.53	6.63
Dohme	11.87	11.90	11.81	11.78	98.76	98.25	99.2	11.63	11.57	11.69	7.00
Do	11.93		11.75								
Do	11.22	11.43	11.05	11.26	98.77	98.40	99.6	11.12	11.08	11.21	6.6
Do	11.64		11.48								
Doolittle	^b 9.396	(^b)	^b 9.33	(^b)							
Do	^b 9.712	9.554	^b 9.594	9.462	99.51	96.60		^b 9.42	^b 9.14		6.32
Havenhill	11.25		11.21								
Do	11.22	11.235	11.14	11.177			^b 99.99			11.17	6.62
Do	11.33		11.287				^b 99.99				
Do	11.51	11.42	11.40	11.333						11.33	6.62
Kebler	11.46	11.35	11.33	11.25	98.75	97.62	99.10	11.11	10.98	11.15	6.08
Do	11.24		11.18								
Do	^b 14.22	(^b)	^b 14.00	(^b)	96.05	94.30	97.86	(^b)	(^b)	(^b)	
Do	^b 13.70	13.96	^b 13.56	13.78				13.24	12.99	13.48	5.90
Lyons	12.05		11.97								
Do	11.97	12.01	11.88	11.92	^b 97.99	^b 99.19	99.90	11.68	11.82	11.88	6.70
Mallinckrodt Chemical Works	11.25		11.21								
Do	11.29	11.27	11.27	11.24	98.9	99.00	99.70	11.12	11.13	11.21	6.8
Ruddiman	10.82	10.85	10.72	10.75	97.02	97.07	100.00	10.43	10.43	10.75	
Do	10.89		10.78								
Do	10.40	10.42	10.34	10.54							
Do	10.45		10.74								
Smith	^b 14.65	(^b)	^b 14.60	(^b)	98.54	98.6	98.7	^b 14.43	^b 14.43	^b 14.45	6.0
Do	^b 14.76	14.70	^b 14.68	14.64	97.92	97.94	98.0	^b 14.34	^b 14.34	^b 14.35	6.05
Average		11.38		11.30	98.03	97.68	98.81	11.19	11.20	11.27	6.44
Maximum	12.05	12.01	11.97	11.92	99.51	99.19	100.00	11.68	11.82	11.88	7.00
Minimum	10.40	10.42	10.34	10.54	96.0	94.30	93.40	10.43	10.43	10.75	5.90
Difference	1.65	1.59	1.63	1.38	3.51	4.89	6.60	1.25	1.39	1.13	1.10
Per ct. var.	14.5	13.9	14.4	12.2	3.6	5.0	6.6	11.2	12.4	10.0	17.0

^a Based on per cent. of morphine weighed on watch glass.^b Not included in average, maximum and minimum results.^c Results obtained by mixing morphine of both sets of duplicates.^d Used hardened filter paper, otherwise same as other set of duplicates.^e Acid standardized against morphine.

TABLE III.—COOPERATIVE WORK ON DETERMINATION OF MORPHINE IN OPIUM,
METHOD III, STEVENS.

NAME.	Without correction.				Average.	With correction, factor 1.12.				Average.
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Blome	11.20	11.17	11.29	11.32	11.24	12.32	12.29	12.41	12.44	12.36
Dohme	11.97	11.68	11.86	11.83	11.83	13.06	12.80	12.98	12.95	12.95
Doolittle . .	11.72				11.72	12.84				12.84
Havenhill . .	11.33	11.35	11.48	11.44	11.40	12.45	12.47	12.60	12.56	12.52
Kebler	11.52	11.67	^a b11.47	^a b10.95	11.60	12.64	12.79	^a b12.79	12.07	12.71
Lyons ^c	^a d12.00	^a d12.14	^a b11.82		^a 11.99	^a d13.12	^a d13.26	^a b12.94		^a 13.11
Mallinckrodt Chemical Works	11.01	11.14			11.07	12.13	12.26			12.19
Puckner . . .	11.36	11.53	11.22	11.25	11.34	12.48	12.65	12.34	12.37	12.4 ^d
Ruddiman . .	11.27	11.20			11.23	12.37	12.32			12.35
Smith	^a 12.93	^a 12.85	^a 12.81		^a 12.89	^a 14.05	^a 13.97	^a 13.93		^a 14.01
Average . . .	11.42	11.39	11.46	11.46	11.43	12.54	12.51	12.58	12.58	12.55
Maximum . .	11.97	11.68	11.86	11.83	11.83	13.09	12.80	12.98	12.95	12.95
Minimum . .	11.01	11.14	11.22	11.25	11.07	12.13	12.26	12.34	12.37	12.19
Difference . .	.96	.54	.64	.58	.76	.96	.54	.64	.58	.76
Per ct. var. .	8.4	4.7	5.6	5.1	6.6	7.6	4.4	5.1	4.6	6.1

^a Not included in average, maximum and minimum results.

^b Per cent. by weight.

^c Acid standardized against morphine.

^d Stood thirty-six hours before morphine was separated.

TABLE I.—OPIUM ASSAYS BY METHOD I, UNITED STATES PHARMACOPEIA, 1900.

ANALYST.	Amount of morphine on filter paper.	Average.	Amount of morphine on watch glass.	Average.	Purity by lime-water.	Purity by potassium hydroxide.	Purity by sulphuric acid titration.	Morphine in opium by lime-water method.	Morphine in opium by potassium hydroxide method.	Morphine in opium by sulphuric acid titra- tion.	Ash in morphine.
	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>P. ct.</i>
Dohme	13.98	13.86	13.86	13.77	91.98	93.20	97.80	12.67	12.84	13.47	2.83
Do	13.74		13.68								
Do	14.45	14.37	14.27	14.18	88.00	94.20	97.40	12.47	13.36	13.81	2.66
Do	14.28		14.09								
Dunlap	14.22	14.19	14.16	14.14	89.00	92.80	94.50	12.58	13.12	13.37	1.90
Do	14.15		14.12								
Do	13.90	13.80	13.85	13.74	92.00	93.50	95.80	12.65	12.85	13.16	1.60
Do	13.69		13.62								
Graham	14.47		14.43	14.43	96.20	97.10	96.50	13.88	14.01	13.92	2.80
Havenhill	14.70	14.65	14.59	14.52	88.49	93.20	97.46	12.85	13.54	14.15	3.67
Do	14.60		14.44								
Do	15.00	14.95	14.90	14.87	85.40	92.60	97.88	12.70	13.75	14.44	3.76
Do	14.90		14.85								
Kebler	13.96	14.01	13.81	13.86	98.90	95.80	94.60	13.71	13.28	13.11	1.30
Do	14.00		13.87								
Do	14.06		13.89								
Parker	14.25	14.17	14.14	14.06	88.63	(e)	96.74	12.46		13.60	3.20
Do	14.10		14.05								
Do	14.30		14.16								
Do	14.03	13.99	13.90	13.83	85.12	(e)	96.89	11.77		13.39	3.80
Do	14.06		13.91								
Do	13.92		13.74								
Do	14.61		14.44								
Do	14.76	14.69	14.59	14.59	83.03	(e)	95.56	12.12		13.94	4.70
Do	14.82		14.73								
Do	14.48		14.45								
Do	14.39	14.44	14.21	14.28	81.40	(e)	97.49	11.62		13.92	5.20
Do	14.49		14.35								
Ragan	13.54	13.47	13.46	13.38	96.30	98.50	95.50	12.83	13.18	12.78	2.70
Do	13.40		13.30								
Schulz	13.23	13.34	13.21	13.32	95.00	99.40	98.10	12.65	13.23	13.06	1.30
Do	13.45		13.42								
Do	13.62	13.48	13.60	13.46	94.60	98.00	98.00	12.73	13.19	13.19	1.40
Do	13.33		13.32								
Wetterstroem	14.75	14.80	14.51	14.60	81.15	90.85	94.39	11.84	13.26	13.77	4.10
Do	14.84		14.70								
Do	14.85	14.81	14.30	14.25	84.84	90.68	92.86	12.06	12.93	13.23	5.00
Do	14.77		14.20								
Average	14.21	14.19	14.08	14.06	89.41	94.60	96.32	12.58	13.29	13.55	3.02
Maximum	15.00	14.95	14.90	14.87	98.90	99.40	98.10	13.98	14.01	14.44	5.20
Minimum	13.23	13.34	13.21	13.32	81.15	90.68	92.86	11.62	12.84	12.78	1.30
Difference	1.77	1.61	1.69	1.55	17.75	8.72	5.24	2.26	1.17	1.66	3.90
Per ct. var.	12.4	11.3	12.0	11.0	19.8	9.0	5.4	17.9	8.8	12.2	129.

• Stood twenty-four hours.

• Stood forty-eight hours.

• Clear filtrate could not be obtained.

TABLE II.—OPIUM ASSAYS BY METHOD II, UNITED STATES PHARMACOPEIA, LAMAR'S MODIFICATION.

ANALYST.	Amount of morphine on filter paper.	Average.	Amount of morphine on watch glass.	Average.	Purity by lime-water.	Purity by potassium hydroxide.	Purity by sulphuric acid titration.	Morphine in opium by lime-water method.	Morphine in opium by potassium hydroxide method.	Morphine in opium by sulphuric acid titration.	Ash in morphine.
	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>P. ct.</i>
Dohme	12.48	12.53	12.34	12.40	98.00	100.00	98.45	12.50	12.40	12.20	.....
Do	12.58		12.46								
Do	12.47	12.54	12.32	12.36	99.00	100.00	98.57	12.24	12.36	12.18	.....
Do	12.60		12.39								
Dunlap	12.71	12.84	12.67	12.81	96.40	100.00	96.10	12.34	12.81	12.32	0.38
Do	12.97		12.95								
Havenhill	13.20	13.19	13.04	13.00	97.54	99.90	97.84	12.67	12.98	12.72	.....
Do	13.18		12.95								
Do	13.17	13.15	13.02	12.97	97.40	99.90	97.84	12.64	12.96	12.67	.43
Do	13.12		12.92								
Kebler	12.80	12.72	12.68	12.62	99.20	100.00	98.30	12.52	12.62	12.40	.18
Do	12.63		12.56								
Do	12.63	12.69	12.55	12.60	99.40	100.00	98.50	12.53	12.60	12.41	.37
Do	12.74		12.65								
Parker	12.50	a12.54	12.37	12.43	99.68	99.90	96.74	12.38			
Do	12.57		12.48								
Do	12.53		12.46								
Do	12.55	a12.54	12.44	12.45	99.03	99.56	97.49	12.41	12.02	.22	
Do	12.37		12.25								
Do	12.65	a12.51	12.54	12.40	97.40	99.70	97.41	12.08	12.36	12.06	.20
Do	12.97		12.84								
Do	13.84	b12.91	12.73	12.79	95.60	99.48	96.58	12.22	12.72	12.35	.24
Hagan	12.79		12.77								
Do	12.65	12.72	12.63	12.70	99.80	99.90	96.10	12.68	12.69	12.20	.46
Schulz	12.73		12.72								
Do	12.21	12.47	12.20	12.46	98.20	99.60	99.00	12.24	12.40	12.33	.90
Do	12.40		12.39								
Do	12.19	12.30	12.18	12.29	98.40	99.80	99.60	12.09	12.25	12.23	.50
Wetterstroem	12.96		12.85								
Do	12.77	12.77	12.01	12.17	95.65	100.00	95.50	11.64	12.17	11.60	.64
Do	12.68		12.15								
Average	12.70	12.69	12.55	12.56	98.05	99.85	97.60	12.33	12.56	12.29	.41
Maximum	13.20	13.19	13.04	13.00	99.80	100.00	99.60	12.68	12.98	12.72	.90
Minimum	12.19	12.30	12.01	12.17	95.60	99.48	95.50	11.64	12.17	11.60	.18
Difference	1.01	.89	1.03	.83	4.20	.52	4.10	1.04	.81	1.12	.72
Per ct. var.	7.9	7.0	8.2	6.6	4.3	5.2	4.2	8.4	6.4	9.1	175.

a Twenty-four hours standing.

b Forty-eight hours standing.

TABLE III.—OPIUM ASSAYS BY METHOD III, UNITED STATES PHARMACOPOEIA, MODIFIED BY DOHME.

ANALYST.	Amount of morphine on filter paper.		Amount of morphine on watch glass.		Purity by linewater.	Purity by potassium hydroxide.	Purity by sulphuric acid titration.	Morphine in opium by linewater method.	Morphine in opium by potassium hydroxide method.	Morphine in opium by sulphuric acid titration.	Ash in morphine.
	Per ct.	Average.	Per ct.	Average.							
Dohme	12.19	12.16	12.14	12.10	100.00	100.00	99.40	12.10	12.10	12.03
Do	12.12		12.06								
Do	11.92		11.76								
Do	11.95	11.94	11.80	11.78	100.00	100.00	99.88	11.78	11.78	11.76
Dunlap	11.63		11.62								
Do	11.72		11.70								
Havenhill	11.93	11.92	11.89	11.89	99.46	99.99	98.84	11.83	11.89	11.76	0.23
Do	11.97		11.93								
Do	11.86		11.86								
Parker	11.77	11.84	11.72	11.75	99.83	99.82	97.34	11.73	11.72	11.43	.18
Do	11.90		11.77								
Do	11.66		11.60								
Do	11.99	12.03	11.92	11.96	99.44	99.90	97.49	11.90	11.95	11.66	.06
Do	12.06		11.99								
Ragan	11.51		11.41								
Do	11.45	11.48	11.44	11.43	99.66	99.43	98.15	11.39	11.36	11.22	.24
Do	11.62		11.62								
Do	11.92		11.91								
Schulz	11.72	11.78	11.72	11.78	97.80	99.60	99.30	11.52	11.73	11.69	.05
Do	11.83		11.83								
Do	11.80		11.79								
Do	11.63	11.72	11.62	11.71	98.60	99.80	99.00	11.54	11.68	11.59
Wetterstroem	11.01		10.74								
Do	10.74		10.50								
Do	11.61	11.12	11.61	10.95	99.60	99.80	98.00	10.90	10.94	10.73
Average	11.74		11.68								
Maximum	12.19	12.16	12.14	12.10	100.00	100.00	99.88	12.10	12.10	12.03	.24
Minimum	10.74	11.12	10.50	10.95	97.80	99.43	96.60	10.90	10.94	10.73	.05
Difference	1.45	1.04	1.64	1.15	2.20	.57	3.28	1.20	1.16	1.30	.19
Per ct. var.	12.3	8.8	14.0	9.8	2.2	5.7	3.3	10.3	9.9	11.3	127.

* Stood twenty-four hours.

* Stood forty-eight hours.

TABLE IV.—OPIUM ASSAY BY METHOD IV (STEVENS').

ANALYST.	Amount of morphine on filter paper.	Average.	Amount of morphine on watch glass.	Average.	Amount of morphine on cotton pledget.	Average.	Purity by lime water.	Purity by potassium hydroxide.	Purity by sulphuric acid titration.
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Dohme	10.65	10.63	10.55	10.49					
Do	10.60		10.43						
Do									
Dunlap	10.25	10.28			10.07	10.13	100.00	100.00	99.20
Do	10.30				10.19				
Do									
Havenhill	10.98	10.94	10.80	10.80	10.48	10.34			99.90
Do	10.90		10.80		10.20		99.46	99.99	
Do									
Parker	11.08	10.89	11.00	10.84	11.03	11.01			97.76
Do	10.70		10.68		10.98		99.30	99.50	
Do									
Ragan	11.13	11.14			10.93	11.04			96.60
Do	11.15				11.15		96.30	100.00	
Do									
Schulz	10.75	10.77	10.73	10.74			98.90	99.20	
Do	10.78		10.75						
Do									
Wetterstroem	11.63	11.67	11.62	11.55	11.28	11.57			96.20
Do	11.50		11.47		11.85		98.80	99.80	
Do									
Wetterstroem	12.46	11.81			10.54	10.89			99.75
Do	10.15				11.23		99.20	99.00	
Do									
Average	10.94	10.94	10.93	10.93	10.88	10.88	90.00	99.69	98.68
Maximum	12.46	11.87	11.62	11.55	11.85	11.57	100.00	100.00	99.90
Minimum	10.15	10.28	10.43	10.49	10.07	10.13	96.30	99.00	96.60
Difference	2.31	1.29	1.19	1.06	1.78	1.44	3.70	1.00	3.30
Per ct. var.	21.1	11.8	10.9	9.7	16.4	13.2	3.7	1.0	3.3

ANALYST.	Without correction.			With correction, factor 1.12.				Ash in morphine.
	Morphine in opium by lime-water method.	Morphine in opium by potassium hydroxide method.	Morphine in opium by sulphuric acid titration.	Morphine in opium by lime-water method.	Morphine in opium by potassium hydroxide method.	Morphine in opium by sulphuric acid titration.		
Dohme	Per cent. 10.49	Per cent. 10.49	Per cent. 10.06	Per cent. 11.61	Per cent. 11.61	Per cent. 11.17		
Dunlap	10.28	10.28	10.24	11.40	11.40	11.36		
Havenhill	10.74	10.79	10.75	11.86	11.86	11.87		0.28
Parker	10.76	10.78	10.66	11.88	11.90	11.78		
Ragan	10.72	11.14		11.84	12.28			
Schulz	10.62	10.66	11.36	11.74	11.78	12.48		10
Wetterstroem	11.41	11.53	10.87	12.53	12.65	11.99		
Do	11.20	11.20	11.15	12.32	12.32	12.27		
Average	10.70	10.75	10.85	11.82	11.87	11.97		
Maximum	11.41	11.58	11.36	12.53	12.65	12.48		
Minimum	10.28	10.28	10.05	11.40	11.40	11.17		
Difference	1.13	1.25	1.31	1.13	1.25	1.31		
Per ct. var.	10.6	11.6	12.0	9.6	10.5	10.9		

* Stood twenty-four hours.

TABLE 1.—CO-OPERATIVE WORK ON DETERMINATION OF MORPHINE IN OPIUM BY VARIOUS METHODS.

ANALYST.	Method I.					Method II.					Method III.				
	Morphine on watch glass.	Average.	Purity by lime water.	Morphine by lime water.	Re-assay morphine on watch glass.	Purity by Re-assay.	Morphine by Re-assay.	Average.	Purity by lime water.	Morphine by lime water.	Re-assay morphine on watch glass.	Average.	Purity by lime water.	Morphine by lime water.	Re-assay morphine on watch glass.
Asher	12 820	12 80	79.8	10.32	10 350	10 38	93.9	9.74	10 350	10 38	93.9	9.74	10 350	10 38	93.9
Do	12 700	12 80	83.7	10.72	11 150	11 18	95.8	10.71	11 150	11 18	95.8	10.71	11 150	11 18	95.8
Dehne	12 860	12 80	83.7	10.72	11 150	11 18	95.8	10.71	11 150	11 18	95.8	10.71	11 150	11 18	95.8
Do	12 750	12 80	83.7	10.72	11 210	11 210	95.8	10.71	11 210	11 210	95.8	10.71	11 210	11 210	95.8
Do	13 250	13 15	82.7	10.88	11 400	11 44	95.3	10.90	11 400	11 44	95.3	10.90	11 400	11 44	95.3
Do	13 050	13 15	82.7	10.88	11 410	11 410	95.3	10.90	11 410	11 410	95.3	10.90	11 410	11 410	95.3
Lyons	13 150	13 15	83.4	10.96	11 130	11 15	98.4	10.97	11 130	11 15	98.4	10.97	11 130	11 15	98.4
Do	13 100	13 15	83.4	10.96	11 130	11 15	98.4	10.97	11 130	11 15	98.4	10.97	11 130	11 15	98.4
Do	13 190	13 15	83.4	10.96	11 130	11 15	98.4	10.97	11 130	11 15	98.4	10.97	11 130	11 15	98.4
Malinckrodt	12 330	12 33	86.5	10.67	10 820	10 88	96.0	10.47	10 820	10 88	96.0	10.47	10 820	10 88	96.0
Do	12 330	12 33	86.5	10.67	10 820	10 88	96.0	10.47	10 820	10 88	96.0	10.47	10 820	10 88	96.0
Parke	12 370	12 57	87.3	10.98	11 025	11 00	96.1	10.79	11 025	11 00	96.1	10.79	11 025	11 00	96.1
Do	12 770	12 57	87.3	10.98	11 025	11 00	96.1	10.79	11 025	11 00	96.1	10.79	11 025	11 00	96.1
Do	11 653	11 91	90.7	10.80	10 197	10 12	95.0	10.12	10 197	10 12	95.0	10.12	10 197	10 12	95.0
Do	12 165	11 91	90.7	10.80	10 197	10 12	95.0	10.12	10 197	10 12	95.0	10.12	10 197	10 12	95.0
Do	12 728	12 54	85.2	10.68	9335	79.5	9.97		9335	79.5	9.97		9335	79.5	9.97
Do	12 345	12 54	85.2	10.68	9335	79.5	9.97		9335	79.5	9.97		9335	79.5	9.97
Schulz	12 060	12 08	93.0	11.23	10 830	10 91	90.3	10.91	10 830	10 91	90.3	10.91	10 830	10 91	90.3
Do	12 100	12 08	93.0	11.23	10 830	10 91	90.3	10.91	10 830	10 91	90.3	10.91	10 830	10 91	90.3
Sciut e	12 270	12 50	89.1	11.14	10 370	10 38	99.5	10.33	10 370	10 38	99.5	10.33	10 370	10 38	99.5
Do	12 730	12 50	89.1	11.14	10 370	10 38	99.5	10.33	10 370	10 38	99.5	10.33	10 370	10 38	99.5
Stevens	10 598	10 68	96.3	10.49	11 080	11 13	95.1	10.58	11 080	11 13	95.1	10.58	11 080	11 13	95.1
Do	10 753	10 68	96.3	10.49	11 080	11 13	95.1	10.58	11 080	11 13	95.1	10.58	11 080	11 13	95.1
Do	11 670	11 71	90.0	10.54	110 525	10 60	94.0	9.97	110 525	10 60	94.0	9.97	110 525	10 60	94.0
Weststrom	11 470	11 71	90.0	10.54	110 525	10 60	94.0	9.97	110 525	10 60	94.0	9.97	110 525	10 60	94.0
Do	11 748	11 71	90.0	10.54	110 525	10 60	94.0	9.97	110 525	10 60	94.0	9.97	110 525	10 60	94.0
Do	11 640	11 56	92.0	10.64	110 680	10 60	94.0	9.97	110 680	10 60	94.0	9.97	110 680	10 60	94.0
Do	11 460	11 56	92.0	10.64	110 680	10 60	94.0	9.97	110 680	10 60	94.0	9.97	110 680	10 60	94.0
Average	12 322	12 29	87.8	10.77	10 87	10 87	96.6	10.50	10 87	10 87	96.6	10.50	10 87	10 87	96.6
Maximum	13 250	13 15	88.3	11.23	11 46	11 44	99.5	10.97	11 46	11 44	99.5	10.97	11 46	11 44	99.5
Minimum	10 599	10 68	79.3	10.22	10 35	10 38	93.9	9.74	10 35	10 38	93.9	9.74	10 35	10 38	93.9
Difference	2 651	2 47	18.5	1 01	2003	16.7	1 66		1 11	1 06	5.6	1 23	1 13	1 56	
Per ct. var.	21.5	20.1	21.1	9.4	20.5	20.5	16.7		10.2	9.75	5.8	11.7	11.6	12.7	

f Stood at about 75° for 17 hours.
g Reported yield, 0.999 gram from 1.100 crude morphine.
h Reported yield, 0.998 gram from 1.100 crude morphine.
i Stood in refrigerator over night, 17 hours.
j Stood 2.5 Cc. instead of 3 Cc. ammonium hydroxide.
k Stood at about 85° for 6 hours.

COMPARISON OF METHODS FOR THE ASSAYING OF ACONITE, BELLADONNA, CINCHONA, COCA LEAVES AND COLCHICUM.

Analyst.	Aconite Leaves.			Aconite Root.		
	Method I. U. S. P.	Method II. Aliquot.		Method I. U. S. P.	Method II. Aliquot.	
		Gravi- metric.	Volu- metric.		Gravi- metric.	Volu- metric.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Parker	0.243	0.241	0.179	0.486	0.588	0.410
" .....	.256	.245	.154	.499	.447	.384
"
Rieger .....	.173	a.234	a.173	.499	.517	.....
" .....	.173	.....	.....	.416	.528	.....
" .....	.....	.....	.....	.....	.516	.....
"
Warren .....	.167	.231	.....	.335	.612	.610
" .....	.172	.254	.....	.346	.611	.....
" .....	.157	.....	.....	.....	.....	.....
Average .....	.191	.241	.169	.430	.546	.468
Maximum .....	.256	.254	.179	.499	.612	.610
Minimum .....	.157	.231	.154	.335	.447	.384
Difference .....	.099	.023	.025	.164	.165	.226
Per cent. var.	51.7	9.5	14.8	38.1	30.2	48.3

a. Mean of two assays.

Analyst.	Belladonna Leaves.			Belladonna Root.		
	Method I. U. S. P.	Method II. Aliquot.		Method I. U. S. P.	Method II. Aliquot.	
		Gravi- metric.	Volu- metric.		Gravi- metric.	Volu- metric.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Parker	0.344	0.362	0.229	0.494	0.530	0.384
" .....	.356	.409	.224	.488	.516	.384
" .....	.356	.....	.....	.....	.....	.....
Rieger .....	.287	.....	.253	.406	.....	.423
" .....	.244	.....	.240	.370	.....	.....
" .....	.270	.....	.....	.407	.....	.....
" .....	.270	.....	.....	.....	.....	.....
Warren .....	.242	.....	.264	.466	.....	.403
" .....	.284	.....	.254	.460	.....	.387
Average .....	.295	.386	.244	.442	.523	.396
Maximum .....	.356	.409	.264	.494	.530	.423
Minimum .....	.242	.362	.224	.370	.516	.384
Difference .....	.114	.047	.040	.124	.014	.039
Per cent. var.	38.6	12.1	16.4	28.0	2.6	9.8

Analyst.	Cinchona (Yellow.)				Cinchona (Red.)			
	Method I, U. S. P. Alkaloid.		Method II, total extraction alkaloid.		Method I, U. S. P. Alkaloid.		Method II, total extraction alkaloid.	
	Total	Ether sol.	Total	Ether sol.	Total	Ether sol.	Total	Ether sol.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Parker	8.11	6.72	8.52	..	5.90	4.10	5.06	..
"	8.02	6.55	8.41	..	5.27	4.27	4.91	..
"	8.24	6.81	8.08	..	..	..	..	..
Rieger	7.85	6.07	7.11	4.45	5.64	3.64	5.40	3.05
"	8.10	4.93	6.85	4.81	5.73	3.25	5.32	3.01
Warren	8.52	5.83	8.26	5.37	5.48	3.51	5.38	3.41
"	8.75	4.98	7.53	5.09	5.56	2.86	5.68	3.46
"	8.79	5.34	7.03	4.67	..	..	..	..
Average	8.31	5.90	7.72	4.88	5.59	3.61	5.29	3.23
Maximum	8.79	6.81	8.52	5.37	5.90	4.27	5.68	3.46
Minimum	7.85	4.93	6.85	4.45	5.27	2.86	4.91	3.01
Difference.....	.94	1.88	1.67	.92	.63	1.41	.77	.45
Per cent. var....	1.11	30.2	21.6	1.9	11.3	39.1	14.5	13.9

Analyst.	Coca leaves.			Colchicum corm.		Colchicum seeds.	
	Method I, U. S. P.	Method II, aliquot.		Method I, U. S. P.	Method II.	Method I, U. S. P.	Method II.
		Gravimetric.	Volumetric.				
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Parker .....	..	..	..	0.454	0.275	0.940	0.611
"	0.498	0.738	0.558	.39	.283	.940	.597
" .....	.510	.708	.540	* (.39)	..	* (.392)	..
Rieger .....	..	..	..	.354	.282	.846	.496
" .....	.613	.724	.592	.334	.260	† (.532)	† (.411)
" .....	.569	.700	.626	..	..	1.044	1.190
" .....	..	..	..	..	..	† (.526)	† (.452)
Warren .....	.382	.643	.400	.316	.286	.642	.658
" .....	.407	.592	.348	.290	.298	.722	.588
Average .....	.496	.684	.511	3.56	.281	.856	.690
Maximum .....	.613	.738	.626	.454	2.98	1.044	1.190
Minimum .....	.382	.592	.348	.290	.260	.642	.496
Difference .....	.231	.146	.278	.164	.038	.402	.694
Per cent. var.	46.5	21.3	54.4	46.0	13.5	46.9	100.6

MR. VANDERKLEED: I think in considering a report like Mr. Kebler's, we are very liable to become our own severest critics, and that it is a mistake to create the impression that pharmaceutical chemists are less accurate in their work, and that the variation in their work is greater than in other lines of assay work. In this connection, I recall a circular gotten out by the proprietors of a certain mineral water which was placed on the market, in which the results of the analyses of a half dozen of the most prominent commercial analytical chemists in the country were placed side by side, and the variations in this water analysis in some instances were very startling. So I do not think we should condemn ourselves absolutely, on the degree of variation brought out in Mr. Kebler's report.

MR. ELDRED: I think Mr. Kebler has perhaps given too much weight to the results showing variations in the assay of drugs—the results of some of that co-operative work, at least. I remember he remarked that the preparation of the sample is one of the very important things. That is true in preparing anything for analysis, whether it be a drug, or iron ore, or whatever it may be; if it is not properly prepared for analysis the results

* Residue purified by re-solution in ether, treatment with water, etc., as in the assay of colchicum corm, U. S. P., not included in average, maximum, or minimum.

† Residue purified as above, substituting petroleum ether for ether, not included in average, maximum, or minimum.

are apt to be very different. Some of the samples which were sent out, presumably ready to be used, were not properly prepared, and the protests which were made against these samples were disregarded by the parties carrying out the co-operative work. I do not know that I can remember off-hand which samples were powdered in various ways, or not, but one sample I remember was powdered so finely that nearly all of it passed through a 150 bolting cloth, by actual experiment; while another sample was so coarsely ground that a very large per cent. of it would not pass through a No.-30 sieve. It is also well recognized that the methods of analysis must be well chosen; that is, not every method will give concordant results even in the hands of people accustomed to doing chemical work. The people co-operating in this work were given no voice at all in the selection of the methods chosen for the co-operative work, and in many cases the methods selected would never have been chosen, I think, if it had been left to the popular vote of the co-operators; and I think many of the variations Mr. Kebler has reported were due to this fact.

The paper was further discussed at some length by Messrs. Lyons, Dohme, C. E. Caspari, Scoville and Puckner, and finally, on motion, duly seconded, referred to the Committee on Publication.

THE CHAIRMAN: The next paper is on "The Permanence of Galenical Preparations," by A. R. L. Dohme and A. Engelhardt.

Mr. Dohme then read the paper as follows :

STABILITY OF GALENICAL PREPARATIONS CONTAINING ALKALOIDS.

BY A. R. L. DOHME AND H. ENGELHARDT.

In order to continue our experiments made some time ago on the stability of fluidextracts, etc., containing alkaloids, and confirm, if possible, the results then obtained, the following investigations were made. The samples under examination were taken at random from our control samples of standard staple products manufactured for the pharmaceutical profession. The following results were obtained :

Sample.	Assayed.	Per cent. Alkaloids.	Re- Assayed.	Per cent. Alkaloids.
F. E. Aconite Root.....	Aug. 31, '07	.42	Jan., '10	.41
" "	Nov. 7, '08	.41	" "	.405
" "	Oct. 11, '09	.41	" "	.40
" Belladonna Root.....	Feb. 18, '08	.41	" "	.42
" "	Oct. 21, '08	.43	" "	.41
" "	Mar. 30, '09	.41	" "	.41
" "	Sept. 30, '09	.41	" "	.41
" "	Dec. 16, '04	.35	" "	.343
" Belladonna Leaves ...	July 14, '08	.304	" "	.31
" "	Sept. 14, '08	.309	" "	.3
" "	Nov. 3, '08	.3	" "	.3
" "	Feb. 16, '09	.31	" "	.31
" Calabar Bean.	June 4, '08	.15	" "	.144
" "	July 23, '08	.155	" "	.145
" "	Oct. 9, '08	.15	" "	.095
" "	July 11, '09	.15	" "	.114

Sample.	Assayed.	Per cent. Alkaloids.		Re- Assayed.	Per cent. Alkaloids.
" Cinchona	Aug. 5, '07	.4	E. S. Alk.	Jan., '10	.4 E. S. Alk.
" Red Cinchona.....	July 28, '09	.5	tot.	"	.51 tot.
" Coca Leaves.....	Oct. 4, '07	.5		"	.4
" "	July 17, '08	.5		"	.3
" Colchicum Seed	Feb. 6, '09	.4		"	.39
" "	April 5, '09	.41		"	.41
" Colchicum Corm.	Jan. 25, '09	.35		"	.32
" "	Aug. 31, '09	.35		"	.35
" Golden Seal.....	Oct. 14, '07	2.0		"	1.97
" "	April 6, '08	2.0		"	2.0
" "	Feb. 10, '08	2.0		"	2.0
" "	Jan. 13, '09	2.0		"	1.92
" Henbane	Sept. 4, '07	.08		"	.08
" "	Mar. 6, '08	.075		"	.071
" "	Mar. 20, '08	.075		"	.078
" Ipecac	Dec. 3, '08	1.5		"	1.45
" "	Jan. 12, '09	1.5		"	1.48
" "	May 5, '09	1.5		"	1.52
" Jaborandi.	Sept. 28, '08	.4		"	.38
" "	July 4, '09	.4		"	.4
" Nux Vomica.	July 6, '08	1. strych.		"	1.04
" "	June 7, '08	1.04	"	"	1.04
" Stramonium Leaves ...	Mar. 2, '09	.25		"	.24

As will be seen from the above results, all the fluidextracts keep their alkaloidal strength well, with the exception of F. E. coca and F. E. calabar bean. The results obtained with a F. E. coca over two years old are rather surprising (a reduction of 20 per cent. in cocaine strength) as former results have shown that during a period of more than a year, the amount of cocaine is reduced to about one-half, calculating the acid used for neutralizing the basic substance obtained as cocaine. This calculation, however, is only correct when a total destruction of the cocaine molecule takes place and not a partial one, with the formation of ecgonine or other bases. For all the remaining drugs, their fluidextracts keep surprisingly well and the confirmation of our previous experience as published in the "American Druggist" indicates, if it does not prove, that a retail druggist can safely depend upon his leading alkaloid-containing fluidextracts and tinctures if they are properly made and carefully stored and kept.

THE CHAIRMAN: We have another paper on the same subject by Mr. Scoville.

Mr. Scoville here presented his paper, on the subject of "The Permanence of Alkaloidal Fluidextracts and Tinctures."

ON THE PERMANENCE OF ALKALOIDAL FLUIDEXTRACTS AND TINCTURES.

BY WILBUR L. SCOVILLE.

In January, 1909, a line of experiments was started to ascertain what changes, if any, occur in the alkaloidal fluidextracts and tinctures, when kept under conditions of exposure to light and air similar to the working conditions of a retail pharmacy or laboratory.

Original packages of the preparation were obtained and were stored in a closet having a glass front and in a fairly strong diffused light. The size of the packages was one pint for most of the fluidextracts, a few being obtained in quarts, while the tinctures were obtained in five-pint lots except cinchona (one quart) and hyoscyamus and physostigma, which two were in one gallon size.

As each bottle was opened, one-tenth of its contents was removed and a suitable portion of this used for assay. Assays have been made every three months, and in each case one-tenth of the original volume was removed, thus simulating as nearly as possible the exposure of infrequently-used preparations in the drug-store. In most cases the assay methods were those of the U. S. Pharmacopœia, or the method by which the preparation had been standardized. Each preparation had been standardized when fresh by other assay chemists, so that the first assay in this series served to indicate whether changes had occurred in the sealed containers.

In a few instances, this first assay is lower than later assays—an explanation for these discrepancies is offered under the discussion of results.

The original assays of the preparations of conium, gelsemium and veratrum, in this list, were made by gravimetric processes, while the assays in the series were made by volumetric titration, thus accounting for the lower results on these preparations.

In studying the following table, two things must be kept in mind.

First, that the old preparation is often more difficult to assay than a fresh one, and a modification in the method may be necessary. This was learned early in the work through a statement made by Mr. J. B. Williams, that it was necessary to use alcohol in extracting the alkaloids from old preparations of hyoscyamus, in order to get them all out. It was at first thought that this applied only to preparations of belladonna leaf, hyoscyamus leaf and stramonium leaf, but it was later learned that the same rule applies also to the other mydriatic preparations, to aconite leaf and to coca, though the last is questionable.

This is an important point in the assay of these preparations.

The Pharmacopœia allows the use of alcohol to break emulsions in all assays, hence its use is justifiable. But that alcohol may be *necessary* for the extraction of the alkaloids, aside from the use for breaking emulsions

is shown in two ways. First, that the addition of alcohol shows an increased extraction of alkaloids by Mayer's test, and second, that the final results by assays with and without alcohol are markedly different, the latter checking closely with the assays on the fresh preparation, while the former are low. This is further explained in the comments on the Mydriatic Drugs, and is also shown in the assays of aconite leaf (4th and 5th assays), wherein the results jump from 0.41 per cent. to 0.50 per cent. through the use of alcohol.

A second point to be borne in mind is that, while other drugs do not require a change in the method for old preparations, yet the extraction of the alkaloids is, in some cases, more difficult and tedious, necessitating a greater number of shakings and the use of a larger amount of solvent. This, in turn, extracts a larger amount of coloring and extraneous matters, and makes titration more difficult (as in ipecac and veratrum), or if gravimetric results are given it is likely to result in increased weight and decreased purity of the alkaloids weighed, as shown in the results on anhalonium.

TABLE OF RESULTS.

	Manufactured and adjusted by assay.	Per cent. Standard.	. Reassayed.				Physical Appearance, January, 1910.
			January, 1909, Per cent.	April, 1909, Per cent.	July, 1909, Per cent.	October, 1909, Per cent.	January, 1910, Per cent.
Fluidextract aconite leaf	July 1, '07	1:1350 *	0.400	0.364	0.417	0.500	0.500 Vy. sl. ppt.
Fluidextract aconite root	Jan. 25, '08	{ (1:700) *	0.390	0.390	} 0.384	0.403	0.430 Vy. sl. ppt.
Tr. aconite root	Oct. 3, '06	0.400	0.410	0.048		0.051	0.051 Vy. sl. ppt.
Ext. aconite root	Sept. 15, '07	0.045	1.180	.....	.....	.....	1.152 Vy. sl. ppt.
Fluidextract anhalonium	Oct. 7, '07	(1:3000) *	5.850	5.870	6.050	6.220	6.480 Sl. ppt.
Fluidextract aspidosperma	July 10, '08	1 000	0.750	1.030	0.940	0.940	1.040 Consid ppt.
Fluidextract belladonna leaf	Mar. 21, '08	0.300	0.290	0.268	0.253	0.304	0.297 Clear.
Fluidextract belladonna root	Sept. 18, '08	0.400	0.399	0.385	0.389	0.380	0.383 Clear.
Tr. belladonna leaf	Feb. 20, '08	0.030	0.029	0.029	0.029	0.030	0.028 Vy. sl. ppt.
Fluidextract cinchona, U. S. P. (a)	May 4, '07	4.000	3.300	3.250	3.080	3.030	2.850 Heavy ppt.
Fluidextract cinchona, U. S. P. (b) . . . . .	.....	4.000	3.970	.....	.....	.....	3.710 Clear.
Fluidextract pale cinchona	Aug. 20, '07	3.000	2.700	2.770	2.950	2.960	2.720 Clear.
Fluidextract red cinchona	Nov. 20, '07	5.000	4.600	4.880	4.700	4.610	4.750 Clear.
Fluid cinchona comp.	Apr. 15, '08 . . . . .	.....	2.900	3.100	3.020	3.120	3.000 Sl. ppt.
Tr. cinchona, U. S. P.	Feb. 5, '07	0.750	0.700	0.640	0.660	0.572	0.632 Consid. ppt.
Tr. cinchona compound	Apr. 15, '08 . . . . .	.....	0.610	0.648	0.693	0.749	0.732 Sl. ppt.
Extract cinchona	Oct. 8, '06	16.000	17.200	.....	.....	.....	20.600
Powd. ext. cinchona	July 3, '07	16.000	15.700	.....	.....	.....	14.100
Fluidextract coca, U. S. P.	Aug. 7, '08	0.500	0.340	.....	.....	.....	0.620 Sl. ppt.
Fluidextract coca, miscible	May 10, '07	0.500	0.350	0.400	0.410	0.490	0.470 Sl. ppt.
Fluidextract colchicum corm	Dec. 6, '07	+ 0.350	0.400	0.410	0.360	0.320	0.310 Sl. ppt.
Sl. ppt. = slight precipitate.			Vy. al. ppt. = very slight precipitate.				

* Squibb's Physiologic test.

TABLE OF RESULTS.—Continued.

	Manufactured and adjusted by assay.	Per cent. Standard.	Reassayed.				Physical Appearance, January, 1910.	
			January, 1909, Per cent.	April, 1909, Per cent.	July, 1909, Per cent.	October, 1909, Per cent.		
Fluidextract colchicum seed.....	Mar. 24, '08.....	0.400	0.320	0.330	0.310	0.295	0.300	Sl. ppt.
Tr. colchicum seed.....	Feb. 26, '08.....	0.040	0.042	0.045	0.044	0.043	0.050	Nearly Cl.
Fluidextract conium.....	Aug. 20, '07.....	*0.430	0.320	0.320	0.210	0.240	0.270	Sl. ppt.
Ext. conium.....	Aug. 29, '07.....	*2.000	.....	.....	.....	.....	1.950	Clear.
Fluidextract gelsemium.....	Dec. 10, '07.....	*0.500	0.420	0.420	0.480	0.420	0.420	Sl. ppt.
Fluidextract fresh gelsemium.....	May 27, '08.....	*0.250	0.230	0.230	0.230	0.250	0.220	Vy. sl. ppt.
Tr. gelsemium.....	Mar. 20, '08.....	*0.050	0.043	0.040	0.036	0.040	0.041	Mkld ppt.
Fluidextract guarana.....	May 28, '08.....	3.500	3.540	3.520	3.600	3.600	3.680	Sl. ppt.
Fluidextract hydrastis.....	Aug. 28, '08.....	2.000	1.980	2.000	2.040	2.000	2.060	Faint ppt.
Aqueous fluid hydrastis.....	Sept. 25, '07.....	1.000	0.915	0.900	0.950	0.960	0.925	Sl. ppt.
Tr. hydrastis.....	Mar. 4, '08.....	0.400	.....	0.340	0.360	0.346	0.344	Sl. ppt.
Fluidextract hyoscyamus.....	Dec. 26, '07.....	0.075	0.074	0.072	0.065	0.060	0.073	Sl. ppt.
Tr. hyoscyamus.....	Jan. 27, '08.....	0.0075	0.0073	0.0074	0.0075	0.0067	0.0072	Sl. ppt.
Fluidextract ignatia.....	Oct. 23, '08.....	1.500	1.450	1.450	1.440	1.450	1.450	Sl. ppt.
Fluidextract ipecac, Carthagea.....	Feb. 14, '08.....	1.750	1.680	1.750	1.770	1.650	1.780	Sl. ppt.
Fluidextract ipecac, Rio.....	Jan. 22, '08.....	1.750	1.630	1.740	1.720	1.680	1.700	Sl. ppt.
Fluidextract kola, N. F.....	.....	1.000	0.940	0.900	0.940	1.020	0.920	Sl. ppt.
Fluidextract kola, P. D. & Co.....	Mar. 24, '09.....	1.000	.....	1.020	1.100	1.120	1.020	Cons. ppt.
Fluidextract fresh kola.....	Aug. 7, '08.....	0.650	0.630	0.692	0.677	0.690	0.705	Sl. ppt.
Fluidextract nux vomica.....	Aug. 27, '08.....	1.000	0.950	1.010	0.996	0.975	0.976	Clear.
Tr. nux vomica.....	June 24, '08.....	0.100	0.095	0.097	0.107	0.097	0.098	Sl. ppt.
Tr. opium, U. S. P.....	June 28, '08.....	1.207	1.260	1.230	1.190	1.250	1.250	Sl. ppt.
Deod. tr. opium.....	Apr. 10, '08.....	1.207	1.270	1.230	1.260	1.260	1.250	Sl. ppt.
Fluid opium comp.....	Nov. 9, '08.....	4.820	4.600	4.600	4.604	4.670	4.580	Sl. ppt.

Vy. sl. ppt. == very slight precipitate.

Sl. ppt. = slight precipitate.

TABLE OF RESULTS.—*Concluded.*

	Manufactured and adjusted by assay.	Per cent. Standard.	Reassayed.				Physical Appearance, January, 1910.
			January, 1909, Per cent.	April, 1909, Per cent.	July, 1909, Per cent.	October, 1909, Per cent.	
Fluidextract physostigma	Nov. 5, '07	0.150	0.163	0.170	0.136	0.110	Sl. ppt.
Tr. physostigma	May 29, '08	0.014	0.018	0.017	0.012	0.014	Clear.
Fluidextract pilocarpus	June 30, '08	0.400	0.350	0.330	0.320	0.290	Mrkd ppt.
Fluidextract sanguinaria, U. S. P.	Mar. 23, '08	2.500	0.800	0.720	.....	0.550	Sl. ppt.
Fluidextract sanguinaria, hydroalc	Feb. 18, '09	2.500	.....	2.580	2.260	1.820	Mrkd ppt.
Tr. sanguinaria	Mar. 25, '08	0.250	0.158	0.080	0.021	(0.061)	Sl. ppt.
Ext. sanguinaria	Oct. 24, '06	10.000	6.390	.....	.....	.....	.....
Fluidextract scopolia	Nov. 6, '06	0.500	0.450	0.450	0.440	0.510	Sl. ppt.
Fluidextract stramonium leaf	Aug. 31, '07	0.250	0.290	0.305	0.270	0.300	Clear.
Fluidextract stramonium seed	Mar. 29, '07	0.350	0.290	0.320	0.325	0.328	Sl. ppt.
Tr. stramonium leaf	Feb. 25, '08	0.025	0.025	0.024	0.022	0.026	Clear.
Fluidextract veratrum, U. S. P.	June 28, '08	*1.000	0.780	.....	0.640	0.610	Clear.
Tr. veratrum, U. S. P.	Apr. 25, '08	*0.100	0.092	0.068	0.057	.....	Clear.

Vy. sl. ppt. = very slight precipitate.

Sl. ppt. = slight precipitate.

Aconite.—The assays show no deterioration in any of the preparations. Since, however, the trustworthiness of the chemical assay is questioned by some, Squibb's physiological test has been applied to each. The fluidextract of aconite leaf was originally standardized by physiological test, and found to respond at a dilution of 1 to 350. It responded at the same dilution in February, 1910. The fluidextract of the root was not standardized physiologically when fresh, but it now responds to the test at a dilution of 1 to 800, which is satisfactory for a fresh preparation.

Likewise the tincture, not standardized by this test when fresh, now responds at a dilution of 1 to 90, corresponding to 1 to 900 in the drug.

The extract was standardized at 1 to 3000, and now responds to the same dilution.

All of the physiological tests were checked by two other chemists, and only the results in which all three agreed are given.

So neither by chemical nor by physiological test is there any deterioration shown.

Anhalonium.—This is a gravimetric assay, and the residue is so deeply colored that titration is impracticable. The apparent increase in strength may easily be due to a larger amount of impurities in the later assays. The assay of this preparation is unsatisfactory at best.

The Mydriatic Drugs—Belladonna, Hyoscyamus, Scopola and Stramonium.—There is a marked peculiarity in the assay of these preparations, in that the older preparations yield their alkaloids much more difficultly than the fresh. This is particularly true of the leaf preparations in which the coloring matters and extractive are in excess. I have found it *impossible to extract all of the alkaloids from these aged preparations by a strict following of the U. S. P. assay process*.

The U. S. P. allows of the addition of a little alcohol to break emulsions which may have formed in shaking, but with these preparations the addition of alcohol is necessary, not merely to break probable emulsions, but to extract the alkaloids.

This was first called to my attention by Mr. Williams, who stated that in the first shaking out of the alkaloids (the fluidextract, rendered alkaline with ammonia, being shaken out with successive portions of chloroform) the chloroform solution soon ceases to show the presence of alkaloids. If now 5 to 10 Cc. of alcohol be added to the alkaline solution, and again shaken with a fresh portion of chloroform, a few drops of the chloroformic solution, after evaporation, will show marked quantities of alkaloid to be present, by the Mayer's test. I have found this to be true of all the mydriatic preparations.

The discrepancies in the figures for scopola are explained in this way:

In the first three assays no emulsion formed and no alcohol was used. In the fourth assay alcohol was used to break an emulsion (in the first extraction), and the result is higher. I do not find any evidence of a

decomposition of the alkaloids in these assays when alcohol is used to favor extraction, and there is a fair agreement between the gravimetric and the volumetric results on these drugs.

In *scopola* the following shows this :

	1st Assay.	2d Assay.	3d Assay.	4th Assay.
Gravimetric.....	0.465	0.480	0.540	0.640
Volumetric	0.450	0.450	0.510	0.505

So with *belladonna* leaf :

Gravimetric.....	0.32	0.33	0.410	0.410
Volumetric	0.26	0.268	0.304	0.297

Similar figures can be supplied for the other preparations.

Hyoscyamus is particularly hard to extract, the last assay requiring 15 to 20 separate extractions with chloroform in order to get out all of the alkaloid. The subsequent extraction of the chloroformic solution with acid, then again of this solution with chloroform, are also tedious. In my judgment this increased difficulty of extraction accounts for the reported deteriorations of fluidextract of henbane which have been made. I do not find evidence of any real deterioration of any of these drug preparations, but that some change in constitution occurs, which is not a deterioration, I do not doubt.

Cinchona.—Only two of the *cinchona* preparations show any marked deterioration.

It will be noticed that the fluidextract of *cinchona*, U. S. P., sample A, was about 19 months old when first opened. It then dropped from 4 per cent. to 3.3 per cent. of ether-soluble alkaloids, and subsequent assays show a steady deterioration.

When the last assay was made, the heavy, gelatinous precipitate which had formed was broken up, and found to weigh (after being well drained) about 75 Gm. A portion of this was assayed and found to contain 4.84 per cent. of ether-soluble alkaloids. In this instance the precipitate has carried down a considerable portion of the alkaloids. Sample B (date of manufacture unknown), which had stood in the same case without disturbance two years, assayed :

January 16, 1908	3.97 per cent.
December 5, 1908	3.71 per cent.
February 4, 1910	3.71 per cent.

This sample is still clear and without precipitate.

The U. S. P. tincture of *cinchona* also shows a deterioration and a considerable precipitate, while the other preparations show little or no change in strength and slight, if any, precipitation. It seems to be fair to infer that in the *cinchona* preparations a marked precipitation indicates a dete-

rioration in alkaloidal strength. So long as they remain clear, or nearly so, there is no change in strength.

Coca.—Without doubt fluidextract of coca deteriorates rapidly. The apparent increase shown in the figures does not look as well when one compares the gravimetric with the volumetric figures.

	1st Assay.	2d Assay.	3d Assay.	4th Assay.	5th Assay.
Gravimetric	0.40	0.46	0.50	0.41	0.49
Volumetric.	0.34	0.39	0.58	0.49	0.62

In these assays the amount of ether used, both for the first and second extraction, was exactly the same in each assay, no attention being paid to the Mayer test.

The fluidextracts were also assayed by the Squibb process, using refined petroleum ether for the first extraction in order to eliminate all alkaloids except cocaine. The fluidextract of coca yielded by this method 0.317 per cent. gravimetric, 0.310 per cent. volumetric. The miscible fluidextract assayed 0.44 per cent. gravimetric, 0.15 per cent. volumetric. The petroleum ether process is more satisfactory as an assay process, since it allows of extraction until no test is obtained with Mayer's solution, and it extracts only cocaine.

As confirming the deterioration of this preparation, three fluidextracts were made in July, 1908, using different menstrua, and were assayed by the petroleum ether process. When fresh these assayed 0.474, 0.468, 0.483 per cent. respectively. After a year and a half they assayed by the same process 0.238, 0.258, 0.333 respectively.

Colchicum.—These preparations were assayed by a modification of the Gordin-Prescott method, which has been accepted by the drug laboratory of the United States Department of Agriculture as giving more accurate as well as more uniform results than the U. S. P. method. The results are lower than the U. S. P. assay, but there is less danger of weighing fatty matters as alkaloid. Even this method is not altogether satisfactory, and allowance should be made for impurities, as in any gravimetric process.

Under the conditions I do not feel warranted in concluding that there is any change in these preparations, since slight changes in the process are likely to cause changes in the results, and the purity of the alkaloids as weighed is questionable.

Conium.—These preparations were assayed volumetrically in order to avoid the errors of gravimetric results. All the figures given, except the standardized assay, are volumetric results. The preparation becomes harder to extract as it grows older, and the last assays were tedious. Here again imperfect extraction of the alkaloid may easily account for reported deterioration of conium preparations. I do not consider that such conclusion is warranted when the added difficulties of extraction are considered.

Gelsemium.—The substitution of volumetric for gravimetric assay may account for the results being all lower than the standard. But the gravimetric results in the series (both being recorded) are also slightly lower in most cases. The differences are not very great, and the uniformity of results in the volumetric series seems to indicate stability in these preparations.

Hydrastis.—The tincture shows a slight but distinctly crystalline precipitate, likewise the aqueous fluidextract. Since hydrastis preparations are known to deposit hydrastine readily, conditions may have much to do with their permanency.

The old preparations are no more difficult of assay than the new, and the final alkaloidal residue has but little color. If any change in these preparations occurs, which seems improbable, it is more likely to be due to a deposition of alkaloid than to any change in its character.

Ipecac.—When 10 Cc. of fluidextract is used for assay, as directed by the Pharmacopœia, so much coloring matter is extracted that the titration becomes very difficult. Furthermore, the older preparations require an increased number of extractions, and this results in a larger proportion of the coloring matter in the final residue. Hence more care is necessary in assaying old than for new preparations.

The results do not show any material change in these.

Pilocarpus.—Shows a deterioration, and it is interesting to note that it has also precipitated markedly. Here again the question whether deterioration and precipitation go together may be raised.

Sanguinaria.—Undoubtedly undergoes a change in its alkaloids in all its preparations. The alkaloids obtained from a fresh preparation by ether are white, but after six months it is impossible to obtain a white alkaloid. The ether solutions have a deep red to violet tint, and the final residue is deeply colored. By using strong acids (10 per cent. nitric or 60 per cent. phosphoric acid), and a large number of shakings, a residue can be obtained approximating the amount in the fresh preparation, but it will be very dark in color and mostly amorphous.

The official (acetic) fluidextract appears to change more rapidly than the hydroalcoholic.

Veratrum.—This is another instance of a volumetric assay being substituted for a gravimetric. The alkaloids of veratrum do not respond sharply to cochineal in titration, and the vagaries in the results may well be ascribed to this fact.

The gravimetric assays agree fairly well with the original standard in all cases except the last assays, which are high for both the fluidextract and the tincture. Considering the unsatisfactory end-point in titration, and the reasonable uniformity of results in the gravimetric results, it may safely be concluded that no change is shown in these preparations.

SUMMARY.

Of the sixty preparations, the oldest is now three and one-quarter years, and the majority are between one and two years old.

Each (except the solid extracts) has been opened at least five times within the past year, and a portion taken out.

Old preparations of the mydriatic drugs are much more difficult to assay than fresh preparations, particularly the leaf preparations, and require the use of alcohol during the process of extracting the alkaloids.

Coca and sanguinaria preparations show a rapid deterioration, and a change in composition.

The cinchona preparations deteriorated, accompanied by and apparently caused by a marked precipitation. A corresponding preparation which has remained clear and been less exposed, shows no deterioration.

Pilocarpus fluidextract shows a slight deterioration, and also a marked precipitation.

Colchicum and conium show vagaries in assay results which forbid positive conclusions, but at least a fair degree of permanence is indicated.

Gelsemium and hydrastis show a possible slight loss in strength, but not sufficient to be of serious import.

The other preparations all show a stability under varying conditions of exposure, etc., which is entirely satisfactory.

THE CHAIRMAN: We have another paper along the same line, which was inadvertently placed in the program for this afternoon's session. It is entitled "The Rate of Deterioration of Fluidextract of Ergot," by Dr. Horatio C. Wood, Jr. If there is no objection I would like to have it presented along with these other two.

Dr. Wood here read his paper.

THE RATE OF DETERIORATION OF FLUIDEXTRACT OF ERGOT.

BY HORATIO C. WOOD, JR., M. D.

The two drugs of whose quality there has been the greatest complaint in recent years are without doubt digitalis and ergot. In the case of digitalis it has been shown by several observers that one of the important causes of its variability is the deterioration which takes place in the galenical preparations after their manufacture. Thus Houghton (Pharm. Journ., October 23, 1909), found that the fluidextract of digitalis lost on an average of 10 per cent. a year and the tincture 9 per cent. Focke (Pharm. Zeitung, volume 49) found that if protected from the light the loss in tincture of digitalis ranged from 10 to 17 per cent. a year, while if exposed to the light it might reach as high as 33 to 50 per cent. In connection with the wide differences in the activity of the different samples of fluidextract, it is interesting to note that while the range in activity of crude digitalis was within the limit of less than 200 per cent., there was a variation in the fluidextract of 400 per cent., which is very suggestive

that one of the most important reasons for the poor quality of so much tincture of digitalis is the changes taking place after its manufacture. It has seemed of interest to me to determine whether this same factor holds true in the case of ergot.

I have, in conjunction with Dr. Hofer in the last two years made comparative tests of a large number of different samples of fluidextract of ergot, both physiologically and chemically. As the methods employed have been already published I shall not go into detail concerning these, but simply state that for physiological assay the figures given represent the rise in the blood pressure in a dog. The chemical assay is based upon the percentage of sphacelotoxin, which as I have shown (*American Journal Pharm.*, May, 1909) corresponds accurately to physiological tests. I would call attention to the fact that although the physiological and chemical figures bear a constant relation to each other, yet the physiological activity does not increase as rapidly as the per cent. of sphacelotoxin, so that when we come to calculate the comparative activity of two samples on a percentage basis, the figures given by the chemical and physiological tests will not be absolutely equal although more or less harmonious.

My attention was first called to the rapidity with which fluidextract of ergot diminishes in power in connection with the sample I have labeled No. 1. Of this preparation I received from the manufacturer a quart bottle from which I was making physiological tests every few days, and was somewhat at a loss to explain the differences in strength in some tests which were made after I had had the bottle for several weeks. In such a short space of time as three months, this sample, which when fresh, had given an average rise of 47, had fallen to 19. This difference in strength was so extraordinary that I determined to make a more careful series of observations as to the rapidity with which the fluidextract of ergot deteriorated under various conditions of keeping. My early experience in this investigation led me to believe that the most important factor in the deterioration of fluidextract of ergot was the action of the air and I have therefore adopted three series of conditions; first, the fluidextract was kept in a bottle stoppered only with a piece of cotton to keep out the dust, admitting free contact with the air, alcohol being added from time to time to make up for the loss through evaporation; second, in bottles which were completely filled and closed with well-fitting corks; and third, in bottles which were completely filled so as to exclude all air and tightly stoppered and sealed with shellac. In the last instance the bottles employed were either kept in the dark or were deep amber color; in the others some of the bottles were amber and some were plain.

The greatest deterioration observed in any of the open bottles was in No. 7, which, when fresh, have a rise of 34 physiologically and 0.70 per cent. of sphacelotoxin, six weeks later gave only rise of 18 and a sphacelotoxin content of 0.39, a deterioration of about 30 per cent. a month.

The slowest loss of power in this series was with No. 2, which gave a loss in physiological power of 15 per cent. a month, and according to the chemical assay, of approximately 11 per cent. a month.

With the bottles which were corked, the deterioration ranged from 4 to 15 per cent. a month, and in the case of the sealed bottles the loss was very distinctly less, in one instance being less than 1 per cent. a month, in no case over 9 per cent. a month. The longest periods of observation were a few weeks less than a year. Sample No. 2, which when fresh gave a rise in blood pressure of 63 mm, 11 months later a rise of 36, showing a loss of 43 per cent. in 11 months or a little less than 4 per cent. a month; No. 4 in 11½ months fell from 37 to 17 in its physiological activity, a loss of 4.7 per cent. a month.

The loss of strength does not seem to progress at a constant rate, but is most rapid immediately after the manufacture of the preparation. For instance, in the case of No. 2 which was obtained from the manufacturer within two weeks of its completion we obtained a rise of 63 mm. in the blood pressure; 5½ months later a rise of 39, showing a deterioration amounting to 6.9 per cent. a month. 11 months later this preparation produced a rise of 36 mm., so that in the last six months the loss in potency was only ⅓ as rapid as in the previous six months. In the case of No. 4 the loss during the first four months was at the rate of 5.4 per cent. a month and in the next seven months at the rate of 4.3 per cent. of the original strength per month. It is, however, manifestly not fair to calculate the percentage loss in different periods on the base of the original strength, for instance in sample No. 2 the rise in pressure at eleven months was only 3 mm. less than that at 5½ months. This 3 mm. would be approximately 5 per cent. of the original 63 but is nearly 8 per cent. of the 39 mm. which was the rise at the sixth month and if we wish to calculate the rate of loss in the later months, the figure for the calculated percentage must evidently be the figure of the last observation so that while the sample showed a loss of 0.5 per cent. a month, if we calculate on the original base of the strength at the fifth month, it should be 1.4 per cent.

But even allowing for this difference in the method of calculating the percentage loss, we find that there is a retardation of the deterioration the longer the preparation is kept. Thus in the sealed bottle No. 5 showed an original sphacelotoxin content of 0.95 and three months later of 0.70, a deterioration of 8.8 per cent. a month. In the next seven months it fell to 0.56, a deterioration from the 0.70 at the rate of 2.9 per cent. a month.

While my experiments upon the subject are not numerous enough to lead to positive conclusions, such evidence as I possess leads me to believe that the fluidextract of ergot deteriorates more rapidly than the crude powdered drug. I have really only one satisfactory series bearing upon this point and that is the sample labeled No. 1. This fluidextract was received from the manufacturer along with the sample of the powdered

drug from which the fluidextract was made. At the time it was received I had not yet worked out the method of chemical assay and therefore cannot give the figure of sphacelotoxin content, but $3\frac{1}{2}$ months later it showed 0.48 per cent. From the powdered ergot which was received at the same time there was made six months later by Professor Cook, a fluid extract and this showed .93 per cent.

To sum up my results, I would say that under the most favorable conditions fluidextract of ergot loses in the first year after its manufacture between 45 and 50 per cent. of its physiological power and that under unfavorable conditions, as when imperfectly protected against atmospheric influences, the loss is much greater than this and may amount to more than 50 per cent. in three months. It seems to me therefore essential that all preparations of ergot should be marked with the date of their manufacture on the label, as is done in the case of antitoxin.

Sample.	How kept.	How long kept.	Monthly loss Physiological.	Monthly loss Chemical.
2.....	Open	5 months	13.5 per cent.	11.4 per cent.
3.....	"	2 "	25.0 " "	..
6.....	"	1 "	31.0 " "	30.0 per cent.
10.....	"	5 "	..	9.4 " "
Average.....		3.2 months	23.2 per cent.	16.8 per cent.
1.....	Corked	3 months	17.0 per cent.	..
2.....	"	5 "	..	5.6 per cent.
3.....	"	6 "	..	4.0 " "
5.....	"	3 "	..	9.1 " "
5.....	"	5 "	..	6.3 " "
7.....	"	3 "	5.2 per cent.	..
8.....	"	1 "	..	14.0 per cent.
8.....	"	3 "	..	14.0 " "
9.....	"	3 "	..	10.6 " "
10.....	"	5 "	..	5.6 " "
11.....	"	5 "	..	4.9 " "
Average.....		3.6 months	11.1 per cent.	8.0 per cent.
2.....	Sealed	5 months	6.9 per cent.	4.7 per cent.
2.....	"	11 "	3.9 " "	2.9 " "
4.....	"	6 "	5.4 " "	2.6 " "
4.....	"	12 "	4.7 " "	..
5.....	"	3 "	..	8.8 per cent.
5.....	"	10 "	..	4.1 " "
6.....	"	5 "	..	5.5 " "
11.....	"	5 "	..	2.5 " "
Average.....		7.1 months	4.4 per cent.	4.4 per cent.

THE CHAIRMAN: The subject is now open for discussion.

MR. ELDRED: I am sorry I am not a physiologist, and I may be caught in some error if I attempt to talk along this line, so I hope you will excuse any errors I may make. I would like to ask Dr. Wood if those rises in blood pressure which he reports are the initial rises, or rises after a certain period of time.

DR. WOOD: I may say, gentlemen, that in conjunction with Dr. Hofer, I published a preliminary communication on this subject last February a year ago, in which we took the rise at the end of five minutes. Since that time, however, we have modified our method slightly and do not take the initial rise, nor the rise in five minutes, nor the rise in ten minutes, but take the average of the three as showing the rise which was maintained for ten minutes.

MR. ELDRED: I would also like to know what his experience has been as to the initial rise, and the rise, say, after ten minutes; which is the more uniform—if he were to take either of those, which would he consider the most reliable as determining the value of the ergot?

DR. WOOD: If I had to take but one, I would take the ten-minute rise.

MR. ELDRED: As I say, I am not competent to speak on this subject; all the information I have upon it has been acquired by talking with our physiologist, and that was his opinion that it was necessary to consider both the initial rise and the later, and in using that method he has found results that are absolutely opposite to what Dr. Wood reports in regard to the deterioration of fluidextract of ergot. In other words, operating on some samples of fluidextract which we happened to have in the laboratory, he found that those were almost as active as fresh samples, the variation being only such as could have been considered as within an experimental area. Of course we did not know what was the strength of these old fluidextracts when they were made, because we had not the method of testing them, but we do know that these fluidextracts, four years old to-day, are as active as fresh extract of ergot.

MR. LYONS: These papers are very interesting, and very useful in the line of investigation. Mr. Scoville reported an examination of extract of cinchona, and apparent deterioration of the fluidextract. My own examination of ipecac showed the same thing—not the official extract, but one of the solubles. I had examined it several times, at intervals of three months, finding a deterioration in the fluid, but suspected that there was a deposit which was bound to be there, and that I found to be true. I have found, as others have found, deterioration progressing very rapidly.

DR. WOOD: Might I be permitted just a word in reply to Mr. Eldred? In the first place, I want to say that taking an old fluidextract of ergot and testing it is absolutely no evidence whether it has deteriorated or not. Unless you know the original strength of that ergot, the age of it is no criterion.

MR. ELDRED: I would just like to say that we had a very definite basis for our start on this extract of ergot. As I stated, four years ago we had no idea of assaying ergot by a rise in blood pressure, but for the last two years we have examined an enormous number of samples of fresh ergot, and ergot of all ages. We have also tested by this method a large number of lots of fluidextract of ergot, as soon as they were made, and my statement was that these old fluidextracts (two of them four years old at the present time) had as great an effect on the blood pressure as the average fresh fluidextract, made from samples of ergot that we knew to represent as good ergot as could be purchased on the market.

THE CHAIRMAN: We have before us now, several papers dealing more particularly with laboratory work. These are by Mr. H. J. Goeckel. One is entitled "The Result of a Few Drug Assays"; another is "The Result of Eighty-seven Opium Assays"; and the third, "The Result of Sixty Coca Assays." Unless Mr. Goeckel is present, we will read them simply by title, and pass on to the next paper, which is by Mr. Eldred on the subject "Analytical Data obtained in the Examination of Official Substances."

Mr. Frank R. Eldred here presented his paper, in abstract.

SOME DATA OBTAINED IN THE EXAMINATION OF OFFICIAL
SUBSTANCES.

FRANK R. ELDRED.

The only excuse for presenting a paper of this character, which contains no new facts, and which goes over ground already covered by many workers, is the desire to make as many data as possible available to the pharmacopœial revision committee. It has been considered in most cases unnecessary to comment upon the data presented, but a few general comments may not be out of place.

Melting Point.—Considering the ease with which this constant can be determined, it is one of the most valuable aids in determining the identity and purity of many organic substances. However, unless it is carefully determined in a proper manner, the results vary so much that it loses much of its value. The looseness with which melting points are stated in the literature is well known; it is usually not even stated whether or not the melting point has been corrected for stem exposure. If melting points are not so corrected it becomes a very important matter that the determinations be made in a uniform manner, otherwise the results will not be comparable. The pharmacopœia should prescribe a standard form of apparatus and detailed directions for making this determination. None of the many special forms of apparatus devised for this purpose should be used, first because they are unnecessary, but chiefly because none of them are in general use and the apparatus selected should be that in which most of the published melting points have been determined. The author would recommend the form of apparatus described by Mulliken ("A Method for the Identification of Pure Organic Compounds," vol. 1, p. 218, et seq.). All melting points in this paper are uncorrected and have been determined in an apparatus of this kind in the manner described by Mulliken. If the pharmacopœial melting points are to be of value as criteria of purity a variation between certain limits should be allowed; it is of no value to state the melting point of the chemically pure substance when it is neither possible nor desirable to use this medicinally. In some cases such limits, usually too narrow, are given in the pharmacopœia, in other cases a definite melting point even to a fraction of a degree is stated. The inconsistency of this is seen when it is remembered that every operator is left free to choose his own method, and that different methods of determina-

tion may cause a difference of several degrees in the observed melting point. Definite forms of apparatus and methods of observation should also be adopted for determining melting points which cannot be determined by the ordinary capillary tube method. These methods should include the determination of the congealing point of substances liquid at ordinary temperatures, the titer point of fatty acids, and the melting points of solid fats and waxes, although the melting points of some of the waxes can be satisfactorily determined by the ordinary capillary tube method. For the determination of the congealing point the apparatus and method described by Gildemeister & Hoffman ("The Volatile Oils," translation by Edw. Kremers, p. 188) are entirely satisfactory. The Association of Official Agricultural Chemists have official methods for the determination of the titer point and the melting point of fats, but for the latter determination a simpler method, for instance the hydrostatic method, using a capillary open at both ends and immersed in water, would probably be preferable.

Boiling Point.—When this determination is necessary it is also important that a uniform method be followed, the methods described by Mulliken (*ibid.*, p. 221–223) might be used.

Specific Gravity.—Most of the specific gravity determinations reported in the literature have been made at 15°/15° C., and as it is almost as easy to make the determinations at this temperature as at 25°/25° C., it seems unfortunate that the pharmacopœia has adopted the latter temperature.

Refractive Index.—This constant is of value in the examination of many oils and other substances. Tables giving the refractive indices corresponding to different strengths of various pharmacopœial articles would be very useful.

Atomic Weights.—The Pharmacopœia should certainly adopt the international oxygen standard.

The data which follow are in most cases from determinations made during the last two or three years.

Acetanilide.—The melting-points of thirty-eight lots examined during the last three years varied from 112° to 113.5° C. A sample which melted at 112.5° C. was recrystallized several times from alcohol and then melted at 115° C. The melting-point of acetanilide is variously stated as 112° C. to 120° C. As it seems to be impossible to obtain acetanilide commercially which melts much above 113° C., the limiting temperatures might be made 113° C. and 116° C.

Acetone.—The specific gravity at 15°/15° C. has been found to vary from 0.797 to 0.801. Most lots distilled completely between 56° C. and 57° C., and met the official requirements in regard to residue and behavior with potassium permanganate; in one lot, however, purchased for reagent purposes, the permanganate color lasted only seven minutes. Most lots are slightly acid to phenolphthalein, requiring from 8 Mg. to 13 Mg. of sodium hydroxide per liter for neutralization.

Acetphenetidin.—The melting-points of fifteen lots varied from 133°C . to 134.5°C ., but one lot examined had a melting-point of only 131°C . Twenty-four lots of Bayer & Co.'s phenacetin had melting-points varying from 131°C . to 135°C . Most of the lots from all of the manufacturers represented melted between 133°C . and 134°C ., and only one lot melted at 135°C . As 135°C . is probably the melting-point of pure acetphenetidin, a variation in melting-point from 133°C . to 135°C . should be allowable.

Boric Acid.—As glycerin is usually acid, even though the acidity cannot be detected by litmus paper, this fact should be taken into consideration in the titration of boric acid, otherwise it will occasion an error probably amounting to from 0.1 per cent. to 0.4 per cent. The phenolphthalein should be added to the water and glycerin and the solution neutralized before adding the boric acid. A solution weaker than normal should be used in the titration if an accurate determination is required. When titrated in the above manner fourteen lots have been found to vary from 98.4 per cent. to 99.8 per cent., only three lots giving the latter figure.

Citric Acid.—Citric acid should contain 8.6 per cent. of water of crystallization; when powdered it often contains less than this amount, sometimes as low as 6 per cent.; this will cause trouble in the preparation of the official effervescing salts.

Phosphoric Acid.—Some sold as 85 per cent. contains as much as 89 per cent. of phosphoric acid. When much stronger than 85 per cent. it sometimes crystallizes and is rather troublesome to liquefy.

Acetic Ether.—Eleven lots have been found to vary from 89 per cent. to 96 per cent. Care should be taken to use acetic ether which has been washed with water for saturating the water to be used in this determination, otherwise low results will be obtained.

Aloes.—Twenty-four lots of crude aloes yielded from 0.5 per cent. to 9.7 per cent. of ash, the yield of ash was in most cases between 1 per cent. and 4 per cent.

Thirty-six lots of powdered aloes yielded from 1.4 per cent. to 4 per cent. of ash. The ash was below 3 per cent. in all except three lots.

Althæa.—Twelve lots of powdered althæa yielded from 4.9 to 7.3 per cent. of ash.

Antipyrine.—The melting points of ten lots were found to vary from 109°C . to 110°C . Judging from these figures and those reported by other chemists, the melting point of 113°C . as given in the U. S. P. and in many of the standard works on chemistry, is too high. A melting point of 109°C . to 111°C . would probably be acceptable.

Asafetida.—Thirty-nine lots of powdered asafetida yielded from 16 per cent. to 64 per cent. of ash, and from 18 per cent. to 61 per cent. of alcohol-soluble material. Crude asafetida varies so much and is so difficult to sample that it seems hardly worth while to present any data in regard to it. At times it is very difficult to obtain any which has a large

enough amount of alcohol-soluble material to meet the official requirement. Twenty lots containing 50 per cent. or more of alcohol-soluble material yielded from 6 per cent. to 30 per cent. of ash, nine of these lots yielded more than 19 per cent. of ash.

Atropine.—Five lots melted between 114.5°C . and 115.5°C . and only one lot had a melting point as low as 114°C .

Atropine Sulphate.—The melting point is influenced by the rate of heating. Twenty lots examined had melting points from 186°C . to 191°C .

Belladonna Leaves.—Twenty-six lots assayed during 1908 were found to contain from 0.23 per cent. to 0.62 per cent. of alkaloids. Only three of these lots assayed less than the official standard of 0.3 per cent. while fourteen lots assayed more than 0.4 per cent. The average content of alkaloids in all lots assayed was 0.409 per cent.

During 1909 twenty-three lots were assayed, the results varying from 0.18 per cent. to 0.54 per cent.; thirteen of these lots were above 0.4 per cent. and only two below 0.3 per cent. The average for 1909 was 0.407 per cent. alkaloids.

Belladonna Root.—During 1908 only six lots were assayed, three of which were below the official standard. The minimum result was 0.18 per cent. and the maximum 0.52 per cent.

Eight lots assayed during 1909 contained from 0.37 per cent. to 0.57 per cent. of alkaloids. The average alkaloidal content was 0.478 per cent., and three lots were below the official standard.

Benzoin.—Forty-four lots contained from 9 per cent. to 35 per cent. of material insoluble in alcohol, 19.1 per cent. being the average. Seventeen of the lots contained more than 19 per cent. of material insoluble in alcohol. The yield of ash was in most cases not above 2 per cent.

Benzosulphinide.—The melting points of twenty lots of saccharin examined varied from 217°C . to 220.5°C . Three lots melted at 217°C ., four lots at 218°C ., eleven lots at 219°C ., one at 220°C . and one at 220.5°C .

Betanaphthol.—Ten lots had melting points from 121°C . to 122°C .

Bismuth Subcarbonate.—Sixteen lots yielded on ignition from 91 per cent. to 91.5 per cent. of bismuth oxide.

Bismuth Subgallate.—Twenty-four lots yielded on ignition from 51.8 per cent. to 53.6 per cent. of bismuth oxide; one lot yielded 55.7 per cent., and one only 51 per cent.

Bismuth Subnitrate.—Thirty-six lots yielded amounts of bismuth oxide varying from 79.7 per cent. to 80.6 per cent. One lot yielded 86 per cent. of bismuth oxide, and one only 77 per cent.

Bismuth Subsalcylate.—In five lots examined the yield of bismuth oxide varied from 62.6 per cent. to 66.5 per cent.

Monobromated Camphor.—Twenty-five lots had melting points varying from 74°C . to 76°C .

Capsicum.—Forty-eight lots yielded from 11 per cent. to 26 per cent.

of ether-soluble oleoresin (dried for 1 hour on a water-bath), the average being 18 per cent. Six lots were below 15 per cent.

Cocaine Hydrochloride.—The melting-point is of no value unless the sample is heated rapidly at a definite rate. A sample heated rapidly to 175° C., and then at the rate of 6° C. per minute melted at 191° C.; the same sample heated rapidly to 170° C., and then at the rate of 2° C. per minute melted at 189° C.; when heated slowly it melted at 180° C.

Cochineal.—The yields of ash from five lots of black grain were from 5.0 per cent. to 8.2 per cent.; from four lots of silver grain, 23.3 per cent. to 25.5 per cent.

Codeine.—Fifteen lots of crystallized codeine had melting-points from 152° C. to 154° C. One lot, heated to expel the water of crystallization, melted at 155° C.

Eucalyptol.—There is no difficulty in obtaining eucalyptol optically inactive, melting between 1° C. and 2° C., and having a specific gravity at 15°/15° C. of 0.926 to 0.930. In examining twenty-six lots three were found to be optically active from -1° C. to +2.40° C.; one lot melted at -2° C., one at -0.5° C. and two at 0° C. The melting-point should certainly not be lower than 0° C., and probably 1° C. to 2° C. would be a satisfactory requirement.

Glycerin.—The strength of glycerin is much more conveniently determined by the refractive index than by the specific gravity. The determination of acidity by titration with weak standard alkali, using phenolphthalein as indicator, affords useful information in regard to quality.

Glycyrrhiza.—In examining a large number of lots of powdered licorice root the yield of ash was found to be from 4 per cent. to 7.5 per cent. The powdered extract was found to yield about the same amount of ash.

Guaiacol Carbonate.—Three lots melted between 84° C. and 85.5° C.

Guaiac.—Twenty-seven lots of crude guaiac resin yielded from 0.2 per cent. to 4 per cent. of ash, and from 67 per cent. to 99 per cent. of alcohol-soluble material, only five lots contained more than 15 per cent. of material insoluble in alcohol.

Twenty lots of powdered guaiac resin yielded from 1 per cent. to 30 per cent. of ash, only five lots yielded more than 5 per cent. The amount of alcohol-soluble material varied from 54 per cent. to 95 per cent., only four lots being above 85 per cent.

Mercuric Chloride.—Forty-four lots varied from almost complete solubility in water to 1.1 per cent. insoluble residue. The residue insoluble in water exceeded the official limit in only four lots.

Hydrastis.—Nineteen lots were assayed during 1908, the average hydrastine content being 3.3 per cent. The lots varied from 2.8 per cent. to 3.8 per cent.

During 1909 twenty lots were assayed, the average being 3.6 per cent.: the lowest assay was 2.8 per cent., and the highest 4.9 per cent.

Hyoscyamus.—Seven lots assayed during 1908 varied from 0.042 per cent. to 0.109 per cent. of alkaloids, the average was 0.075 per cent. Four lots were below the official requirement.

During 1909 fifteen lots were assayed, the lowest result being 0.039 per cent., the highest 0.14 per cent., and the average 0.085 per cent. Seven lots were below the official requirement.

During the present year two lots have been assayed which contained only 0.02 per cent. of alkaloids.

Iodine.—A large number of lots examined contained from 98.3 per cent. to 99.9 per cent. of iodine.

Solution of Formaldehyde.—One hundred lots were found to contain from 36 per cent. to 39 per cent. of formaldehyde; most of the lots were above the official requirement.

Lupulin.—Twenty-six lots were examined and only one was found to contain less than 60 per cent. of ether-soluble material; this sample contained 42 per cent. of ether-soluble material and yielded 36 per cent. of ash. The other lots varied from 64 per cent. to 76 per cent. of ether-soluble material and yielded from 10.8 per cent. to 20.8 per cent. of ash. Four lots otherwise satisfactory yielded over 18 per cent. of ash and nine lots over 15 per cent. The ash limit should be raised to 18 per cent. and a good drug could be insured by raising the requirement for ether-soluble material to 65 per cent. or 66 per cent.

Lycopodium.—Four lots yielded from 1.1 per cent. to 2.2 per cent. of ash. The official ash limit is unnecessarily high.

Mastic.—The acid values of fourteen lots varied from 50 to 67, only one lot being as high as the official requirement of 65.

Methylene Blue.—Much of the methylene blue on the market yields an amount of ash in excess of the official limit of 0.4 per cent.; thirty-two lots have been found to yield from 0.04 per cent. to 25.0 per cent. of ash. The ash limit could be raised to 1 per cent. if zinc and arsenic are excluded by suitable tests. A limit of material insoluble in alcohol, and a method of colorimetric valuation or titration with titanous chloride would be of value in insuring a satisfactory product.

Myrrh.—Twenty lots of crude myrrh averaged about 58 per cent. of material insoluble in alcohol, and about 32 per cent. of alcohol-soluble material (dried for one hour on a water bath); this leaves about 10 per cent. of material volatilizing under these conditions. The largest residue insoluble in alcohol was 74 per cent., the smallest 52 per cent. The ash averaged 8 per cent., the lower and upper limits being 4 per cent. and 14 per cent. Eleven lots of powdered myrrh varied from 29 per cent. to 53 per cent. of alcohol-soluble material, the average being about 35 per cent. The ash averaged about 11 per cent., and varied from 5 per cent. to 16 per cent.

Nux Vomica.—Two lots assayed in 1908 contained 1.42 per cent. and 1.43 per cent. of strychnine.

Eight lots in 1909 averaged 1.42 cent. and varied from 1.27 per cent. to 1.58 per cent.

Oil of Bitter Almond.—Eleven lots contained from 2 per cent. to 3.8 per cent. of hydrocyanic acid.

Expressed Oil of Almond.—Eight lots were examined with the following results :

$^{415^{\circ}}/15^{\circ}$	0.917 to 0.919
$^{\alpha}D_{20}$	1.4703 to 1.4705
Iodine value (Wijs)	93.4 to 100.0
Saponification value	188.5 to 193.0

Oil of Anise (Star).—Fifty-one lots varied in optical rotation from $+0.17^{\circ}$ to -3.5° , and in the congealing point from 14.5° to 18° .

Oil of Caraway.—Nineteen lots varied in optical rotation and specific gravity within the following limits :

$^{415^{\circ}}/15^{\circ}$	0.904 to 0.912
$^{\alpha}D$	$+76.1^{\circ}$ to $+80.3^{\circ}$

Oil of Coriander.—Fifteen lots were found to vary within the following limits :

$^{415^{\circ}}/15^{\circ}$	0.866 to 0.912
$^{\alpha}D$	$+9.9^{\circ}$ to $+11.7^{\circ}$

Oil of Erigeron.—Eight lots varied within the following limits :

$^{415^{\circ}}/15^{\circ}$	0.869 to 0.883
$^{\alpha}D$	$+53.6^{\circ}$ to $+63.6^{\circ}$

Oil of Fennel.—Six lots examined were found to vary within the following limits :

$^{415^{\circ}}/15^{\circ}$	0.964 to 0.975
$^{\alpha}D$	$+13.3^{\circ}$ to $+17.1^{\circ}$
Congeeing point	3° to 5°

Oil of Hedeoma.—Fourteen lots were examined with the following results :

$^{415^{\circ}}/15^{\circ}$	0.926 to 0.932
$^{\alpha}D$	$+18^{\circ}$ to $+31^{\circ}$

Soluble in from 1.5 to 3.5 volumes of 70 per cent. (by volume) alcohol.

Oil of Lavender Flowers.—Thirteen lots were examined with the following results :

$^{415^{\circ}}/15^{\circ}$	0.886 to 0.903
$^{\alpha}D$	-3° to -6.7°
Ester number.	90 to 98

Soluble in 2 to 3 volumes of 70 per cent. (by volume) alcohol.

Linseed Oil.—The following data were determined in examining twenty-seven lots :

$d_{15}^{15}/15^{\circ}$	0.932 to	0.934
n_D^{20}	1.4000 to	1.4815
Iodine value (Wijs)	171.0 to	200.0
Saponification value	187.5 to	196.8

Oil of Peppermint.—Forty-two lots were examined with the following results :

$d_{15}^{15}/15^{\circ}$	0.900 to	0.909
n_D	-19.4° to	-28.8°
Menthyl acetate	5.3% to	13.1%
Total menthol	50.0% to	66.0%

Soluble in from 2 to 4 volumes of 70 per cent. (by volume) alcohol.

Oil of Spearmint.—The following data were determined in the examination of four lots :

$d_{15}^{15}/15^{\circ}$	0.933 to	0.940
n_D	-45.3° to	-50.2°
n_D^{20}	1.4880 to	1.4885

Soluble in an equal volume of 80 per cent. (by volume) alcohol.

Cod-liver Oil.—The following data were obtained in examining forty-eight lots :

$d_{15}^{15}/15^{\circ}$	0.919 to	0.929
n_D^{20}	1.4775 to	1.4800
Iodine value (Wijs)	138.4 to	194.0
(Only five lots were found with iodine values below 150.)		
Saponification value	178.0 to	191.7

Oil of Myristica.—Eleven lots were examined, the limits being as follows :

$d_{15}^{15}/15^{\circ}$	0.904 to	0.925
n_D	$+17^{\circ}$ to	$+20.3^{\circ}$

Soluble in 1 to 3 volumes of 90 per cent. (by volume) alcohol.

Olive Oil.—Twenty-four lots were examined with the following results :

$d_{15}^{15}/15^{\circ}$	0.915 to	0.918
n_D^{20}	1.4683 to	1.4693
(Two lots were found having refractive indices at 20° of 1.4706 and 1.4708.)		
Iodine value (Wijs)	78.8 to	86.5
Saponification value	185.3 to	195.4

Oil of Pimenta.—Fifteen lots were examined with the following results :

$^{15}_{15}$ °	1.034	to	1.046
$^{20}_{20}$ °	—0.4°	to	—3.0°
Eugenol	70 %	to	80 %

Soluble in from 1 to 2 $\frac{1}{2}$ volumes of 70 per cent. (by volume) alcohol.

Castor Oil.—Fourteen lots varied within the following limits :

$^{15}_{15}$ °	0.960	to	0.967
$^{20}_{20}$ °	1.4780	to	1.4802
Iodine value (Wijs)	82.0	to	86.9
Saponification value	176.4	to	180.9

Oil of Rose.—The following data were obtained in examining six lots :

$^{30}_{15}$ °	0.856	to	0.859
$^{20}_{20}$ °	—1.3°	to	—2.7°
$^{20}_{20}$ °	1.4610	to	1.4665
Congealing point	19°	to	21°
Saponification value	11.9	to	17.1

The saponification values for thirty-four lots varied from 11.9 to 22.2, and the optical rotation from —1.3° to —3.6°.

Oil of Rosemary.—Thirteen lots varied within the following limits :

$^{15}_{15}$ °	0.900	to	0.913
$^{20}_{20}$ °	+1.3°	to	+14.2°

Oil of Savin.—Twenty-one lots were examined with the following results :

$^{15}_{15}$ °	0.906	to	0.925
$^{20}_{20}$ °	+39°	to	+56.3°

Soluble in $\frac{1}{2}$ to 1 volume of 90 per cent. (by volume) alcohol.

Oil of Sassafras.—Fourteen lots varied within the following limits :

$^{15}_{15}$ °	1.07	to	1.08
$^{20}_{20}$ °	+2.6°	to	+3.9°

Soluble in 1 to 2 volumes of 90 per cent. (by volume) alcohol.

Croton Oil.—Eight lots were examined with the following results :

$^{15}_{15}$ °	0.942	to	0.948
$^{20}_{20}$ °	1.4784	to	1.4785
Iodine value (Wijs)	104.0	to	116.0
Saponification value	200.0	to	235.0

Phenol.—Eighteen lots were found to melt at from 40° to 41°, and to contain from 96 per cent. to 98.4 per cent. of absolute phenol.

Phenyl Salicylate.—Twenty-four lots varied in melting-point from 40.5° to 43°.

Pilocarpine Hydrochloride.—Fourteen lots melted at temperatures from 194° to 199° C.

Pilocarpine Nitrate.—Five lots melted at temperatures from 167° to 172° C.

Pilocarpus.—Only the *Pilocarpus microphyllus* has a high enough alkaloidal content to meet the official requirement; four lots of this species assayed in 1908 were found to contain 0.78 per cent., 0.96 per cent., 1.14 per cent., and 0.98 per cent. of alkaloids. During 1909 five lots were assayed with the following results: 0.94 per cent., 0.83 per cent., 1.23 per cent., 0.91 per cent. and 0.98 per cent. Three lots of *Pilocarpus Jaborandi* assayed, 0.15 per cent., 0.35 per cent. and 0.13 per cent.

Piperine.—Four lots were found to have melting points of 128° C. to 129° C. The melting point is given in "Beilstein" as 128° C. to 129.5° C.

Potassium Bicarbonate.—A large number of lots have been found to vary from 98 per cent. to 99.9 per cent., most lots being between 98.5 per cent. and 99.5 per cent.; one lot was found to be only 96 per cent.

Potassium Chlorate.—Potassium chlorate, on account of the practice of shipping in barrels and kegs, frequently contains particles of wood and paper fiber which might make the manufacture of tablets somewhat dangerous. One lot was shipped in kegs which had been charred on the inside; they were carelessly lined with paper, and the chlorate contained many particles of charcoal and partially charred wood.

Resorcinol.—Seventeen lots have been found to have melting points from 108° C. to 110° C.

Salicin.—The melting points of seven lots were from 196.5° C. to 198° C.

Santonin.—Sixteen lots melted between 169° C. and 171° C.; one lot at 166° C. and one at 168° C. A melting point requirement of from 169° C. to 171° C. would probably be satisfactory.

Sodium Carbonate.—Lots of the monohydrated salt have been found to vary from 83.5 per cent. to 87 per cent. of sodium carbonate. Most of the salt sold as dried sodium carbonate is the monohydrated salt.

Exsiccated Sodium Phosphate.—The amount of water in a large number of lots examined varied from 0.2 per cent. to 14.5 per cent.

Sulphonethylmethane.—Five lots had melting points between 75° C. and 76° C., one lot melted at 71° C. Six lots of Bayer & Co.'s trional had melting points between 75° C. and 77° C.

Sulphonmethane.—Six lots melted between 125° C. and 125.5° C. Eleven lots of Bayer & Co.'s sulfonal had melting points between 125° C. and 126° C.

Terpin Hydrate.—Twelve lots had melting points between 115° C. and 117° C.

Vanillin.—Twenty-four lots melted between 80° C. and 80.5° C., two lots at 77.5° C., one at 79.5° C., and three at 81° C.

Verastrum.—In 1908 five lots assayed 1.33 per cent., 1.9 per cent., 1.94 per cent., 1.21 per cent., and 1.66 per cent.

In 1909 four lots assayed 1.60 per cent., 1.53 per cent., 1.69 per cent., and 1.85 per cent.

The foregoing results include only those which it was thought might be of assistance to the revision committee in establishing standards. Only data based upon a considerable number of determinations have been given, and in most cases data upon well-established points have been omitted. As this is not intended to be a report upon market conditions or adulterations, lots which have been found to be adulterated or of poor quality have not been included except in a few cases; where no mention is made of such lots only very few have been found in proportion to the number reported upon. The limits given are not recommended for adoption by the Pharmacopœia, but only for consideration in connection with other published data.

MR. SCOVILLE: I differ with my friend Eldred about the 15° C., and I do not favor 25, for this reason; all of the apparatus so far as I recall now, is standardized at 20° C., and for that reason it is the temperature adopted by the Bureau of Standards at Washington, and also the standard adopted by the International Society of Applied Chemistry—I have forgotten the exact title of that Association—and it seems to me that to use an apparatus at 20° C., would be rather a peculiar situation; we would have to adjust all our apparatus.

MR. ELDRED: In that connection, I would like to say that all the apparatus we have in our laboratory is standardized at 15° C.

THE CHAIRMAN: We have one more paper, which is in print, entitled "Microscopical Examination of Extracts of Belladonna and Scopola," by Mr. E. N. Gathercoal. Mr. Gathercoal is not here, and Mr. Clark will say a few words in regard to the paper.

The following is the full text of the paper:

MICROSCOPICAL EXAMINATION OF BELLADONNA EXTRACT.

E. N. GATHERCOAL.

A question recently arose as to whether extract of belladonna root or extract of scopola could be legally used in the manufacture of belladonna plasters, provided the plaster contained the official requirement of mydriatic alkaloids. This led to the question as to the possibility of distinguishing, with the microscope, between extract of belladonna leaf, extract of belladonna root and extract of scopola. Upon investigation it was found that sufficient characteristic vegetable tissue could usually be obtained from an extract to identify the drug from which the extract was made.

A portion of the extract about the size of a wheat grain is smeared on a glass slide and viewed with a low power (75 diameters) of the microscope. The most prominent objects seen in the field of view, if the extract is of

belladonna root or scopola root, are a large number of rhombohedron-like crystals, sometimes quite irregular and measuring 25 to 150 microns in longest diameter. Another striking feature in specimens of some of the root-extracts is the considerable amount of fixed oil globules present. In but a few instances is starch found and very seldom cellular tissues. The extracts of belladonna leaf do not show the crystals nor fixed oil as in the root extracts, but present an almost homogeneous appearance.

A similar portion of the extract is smeared on a slide and covered with a drop of water and a cover glass. The crystals rapidly dissolve, the oil globules become more distinct, and starch may be found. The starch and oil are distinguished by the use of iodine solution. In the leaf-extracts some dark masses of oily chlorophyll may separate out.

To a similar smear of the extract a drop or so of alcohol is added and now the crystals do not dissolve, but the oily substances do gradually disappear.

One gram of the extract is well mixed in a test-tube with 25 Cc. of 50 per cent alcohol, rubbing and stirring the extract into the fluid with a glass rod. The mixture is allowed to stand several hours until the precipitate settles out or it may be centrifuged at once. The precipitate in most cases is quite voluminous and falls slowly. The clear, supernatant liquid is poured off as completely as possible and a mount prepared from the precipitate. This may show starch, oil and cellular tissues, but so much brown extractive is present as to largely obscure other material.

To the remainder of the precipitate is added about 5 Cc. of concentrated hydrochloric acid, which dissolves the starch and the brown extractive, but does not injure the vegetable tissues. Then about 10 Cc. of alcohol is added, the precipitate allowed to subside and the fluid decanted. The use of the centrifuge for throwing out precipitate permits of a great saving of time. The precipitate, which in most cases is now very small in amount, is transferred to a slide and mounted in the few drops of fluid adhering to it. Or it may be transferred with several drops of liquid to a watch glass or small white crucible, nearly dried with gentle heat and then scraped onto a slide and mounted in a drop of chloral hydrate solution.

In these mounts particles of cellular tissue that were present in the extract are seen. The amount of these particles varied widely in the different extracts examined. There were found pieces of thin-walled parenchyma filled with partially destroyed starch, masses of parenchyma and tracheal tubes, separated pieces of tracheal tissue, smaller and yet smaller pieces of parenchyma tissue and cells, occasionally a fiber, some extraneous tissues as cotton fibers, and in one instance several well-defined cells of coconut shell, and finally in some of the mounts many pieces of black substance resembling charred or carbonized matter.

The tracheal tissues were used as the principal means of distinguishing between scopola and belladonna roots. Some of the tracheal tubes of belladonna have on their walls well-defined, slightly elongated, bordered pits and none of the tubes of scopula have such markings. Some of the tubes

of scopola have on their walls much elongated, very prominent slits with the portions of the walls between the slits heavily thickened, giving a very characteristic reticulate appearance. None of the belladonna tubes have such markings. However, some of the belladonna tubes have pores not bordered, and more elongated, so as to present a rather finely reticulate appearance, and also, some of the scopola tubes have the slits on the walls rather shorter and approach in appearance the tubes of belladonna just mentioned.

The material examined consisted of twelve extracts, Nos. 1 to 12, submitted to me for examination as extract of belladonna; one extract of belladonna root, No. 13, two extracts of belladonna leaf, Nos. 15 and 16, one extract of scopola root, No. 14, all purchased in original packages in the open market, and an extract of belladonna root, No. 17, an extract of scopola root, No. 18, and an extract of belladonna leaf, No. 19, all personally prepared from selected drugs according to the U. S. P.

EXAMINATION OF BELLADONNA EXTRACTS.

No.	Microscopic Examination of Whole Extract.	Microscopic Examination of Precipitate.	Color of Sol.	Conclusion.
1	Crystals, little starch, very little fixed oil.	Several pieces scopola, some charred masses.	Dark brown.	Scopola root.
2	Crystals, some starch, much fixed oil.	Several pieces scopola, few pieces belladonna.	Brown.	Scopola and belladonna roots.
3	Crystals, no starch, much fixed oil.	No tracheal tissue determined.	Light brown.	Belladonna root. (?)
4	Crystals, some starch, much fixed oil.	Four pieces belladonna.	Straw color.	Belladonna root.
5	Crystals, some starch, very little oil.	Several pieces scopola, two pieces belladonna.	Dark brown	Scopola and belladonna roots.
6	Crystals, some starch, very little oil.	Many charred pieces, much extraneous matter	Dark brown.	Scopola root (?)
7	Crystals, little starch, very little oil.	Several pieces scopola, no belladonna.	Dark brown.	Scopola root.
8	Crystals, very little oil or starch.	Several pieces scopola, no belladonna	Dark brown.	Scopola root.
9	Crystals, little starch, considerable oil.	Three pieces scopola, several pieces bella.	Light brown.	Scopola and belladonna roots.
10	Crystals, some starch, very little oil.	Several pieces scopola, no belladonna.	Dark brown.	Scopola root.
11	Crystals, some starch, very little oil.	Several pieces scopola, no belladonna.	Dark brown.	Scopola root.
12	Crystals, little starch, very little oil.	Several pieces scopola, several pieces belladonna	Medium brown.	Scopola and belladonna roots.
13	Numerous large crystals, much oil.	Two small pieces belladonna.	Light brown.	Belladonna root.
14	Numerous crystals, much oil.	Two pieces belladonna, Two pieces undetermined	Light brown.	Scopola and belladonna roots (?)
15	No crystals, no starch, some oily chlorophyll	Two pieces epidermis, one small spiral duct	Dark green.	Belladonna leaf.
16	Large irregular crystals, little greenish oil.	No tracheal tissue determined.	Brown.	(?)
17	Many crystals, much oil, no starch.	No tracheal tissue determined.	Straw color.	Belladonna root.
18	Crystals, no starch, some oil.	Several pieces scopola.	Light brown.	Scopola root.
19	No crystals, no starch, some oily chlorophyll.	Four small pieces belladonna.	Greenish brown.	Belladonna leaf.

In the above tabulation "pieces" of scopola or belladonna refers to pieces or masses of characteristic tracheal tissue as previously described.

Referring to No. 3, one of the commercial extracts, would say that this extract yielded no tracheal tissue after repeated trials. However, as it contained numerous crystals characteristic of the root extracts and much fixed oil characteristic of belladonna root extract, it is probably belladonna root extract. No. 6 contained such a mass of black, charred pieces and so much extraneous matter that it was impossible for me to separate out characteristic tracheal tissue and my conclusion that it is scopola root extract is open to question.

Nos. 13, 14 and 15, labeled "Extract of Belladonna Root," "Extract of Belladonna Leaf," and "Extract of Scopola," respectively, over the name of a well-known pharmaceutical manufacturer, contained but little tracheal tissue and no charred matter. However, the extract of scopola certainly contained belladonna extract if it was not all belladonna.

No. 16, labeled "Extract of Belladonna Leaf," produced, upon mixing with dilute alcohol, a copious, white precipitate, insoluble in water or alcohol, but soluble in acids without effervescence. Under the low power of the microscope this powder appeared as large irregular crystals. Upon ignition the ash amounted to nearly 10 per cent. It contained magnesia. No tracheal tissue was determined in this extract, though from the presence of a very little greenish oil it is probably leaf extract.

Referring to Nos. 17, 18 and 19, the extracts which were carefully prepared in the laboratory, using filter paper beneath the powdered drug in the percolator, would say that the amount of cellular tissue present was small, but sufficient characteristic tracheal tissue was obtained from each extract but one, the belladonna root extract, to identify the extract.

THE FIXED OILS FOUND IN THE EXTRACTS.

Some of the powdered belladonna root from which the extract was prepared according to the U. S. P., was extracted for six hours with petroleum benzine in a Soxhlet extraction apparatus to determine, if possible, the amount of fixed oil present in the root. After the evaporation of the benzine, a slight residue amounting to .75 per cent. remained, and this appeared to be mostly a yellowish fixed oil. Some of the extract prepared from this belladonna root was extracted in a similar manner and yielded a residue, 3.26 per cent., most of which appeared to be a fixed oil.

The amount of fixed oil is apparently greater in belladonna root than in scopola root, though the personally prepared scopola root extract contained more oil than the commercial scopola root extracts.

THE CRYSTALS FOUND IN THE EXTRACTS.

The crystals, apparently so abundant in the root extracts, were at first thought to be milk sugar added to the commercial extracts, but when they

were found in greatest abundance in the home-made extracts (both of scopola root and belladonna root) to which no milk sugar was added, it became evident that probably these crystals were not milk sugar. A portion of the extract of belladonna root prepared in the laboratory was dialysed for 24 hours and the dialysate tested for sugar. The solution gave a dextrogyrate reading on the polariscope and reduced Fehling's solution. Quantitatively with Fehling's, it amounted as glucose to about 5 per cent. of the extract. Upon evaporation of a portion of the dialysate to constant weight the residue amounted to more than 15 per cent. of the extract. Upon ignition, the ash obtained from a portion of the dialysate amounted to .8 per cent. of the extract.

The amount of these crystals appears to be about the same in the scopola as in the belladonna root extracts, but the amount in some of the commercial extracts was much less than in the home-made extracts.

THE COLOR OF THE EXTRACTS AND THEIR SOLUTIONS.

The color of the extracts was quite similar, especially where the surfaces of the extracts as found in the jars were not cut into, the color being in all cases a very dark brown to black. Freshly-cut surfaces, however, varied somewhat in color, some being a darker brown than others and the leaf extracts showing a decided green color. The solutions or mixtures in dilute alcohol, however, varied much in color, the root extracts ranging from a light straw color to a very dark brown, the leaf extracts showing various shades of green. At the first tabulation of the commercial extracts it appeared as though the solutions of the scopola extracts were uniformly much darker than the solutions of the belladonna extracts, but this I hold to be not strictly so, for the scopola root extract prepared by myself formed a solution nearly as light in color as any of the belladonna extracts.

Nearly all of these extracts were assayed and in each case the alkaloidal content fully met the U. S. P. requirement for extract belladonna leaves. It is assumed the alkaloids were the mydriatic alkaloids.

University of Illinois School of Pharmacy, Chicago, April 9, 1910.

THE CHAIRMAN: That brings us to the end of our program for this morning, and a motion to adjourn is in order.

On motion, the Section adjourned to 3 o'clock, p. m.

ADJOURNED SESSION.

The Section assembled promptly at 3 o'clock, p. m., and was called to order by Chairman Wilbert.

THE CHAIRMAN: Mr. Kebler has a paper which is on our program for to-morrow morning, but as he is leaving the city to-day, he desires to present it now. We will be

glad to have Mr. Kebler present his paper, which is entitled "The Quality of Medicinal Hydrogen Dioxide at Present on the Market."

MR. KEBLER: I want to thank the Chairman for giving me an opportunity to present this paper now, as I have to go home to-night, and would like to read it, or present the substance of it, for what it is worth.

The paper was here read.

THE QUALITY OF MEDICINAL HYDROGEN DIOXIDE AT PRESENT ON THE MARKET.

BY LYMAN F. KEBLER.

Hydrogen dioxide is undoubtedly the most popular refined germicide and antiseptic at present on the market. It is also largely used by the medical profession. Unfortunately, however, it is prone to deteriorate more or less rapidly. Numerous investigations have been made with a view of devising methods to produce a stable product. The results in the past, however, have not been uniformly satisfactory. With this condition obtaining, it was decided to make an investigation of the quality of the various brands on the market for the purpose of arriving at a fair basis of action. In order to eliminate disturbing factors as far as possible, it was decided to have the work carried on by two independent workers at two different points, namely, Washington, D. C., and Nashville, Tennessee. The question of obtaining fresh material was also a desideratum and carefully considered. In order to provide for this, the goods were ordered from two wholesalers, with instructions that fresh material was desired. The work was begun in the fall of 1907 and continued over a period of from nine to twelve months. Mr. L. E. Warren conducted the experimental work in Washington and Dr. E. A. Ruddiman at Nashville.

RESULTS OF INVESTIGATION MADE IN WASHINGTON.

Determination of hydrogen dioxide. Unless otherwise stated, the methods prescribed by the United States Pharmacopœia, Eighth Revision, for testing the quality and purity of hydrogen dioxide solutions, were employed. In view of the fact that the value of a hydrogen dioxide solution is largely judged by the actual amount of hydrogen dioxide present, the various products were analyzed with particular reference to this point as rapidly as possible after receiving same. The Pharmacopœial method was used, excepting that the measured samples were weighed and the percentage computed on this basis. The results obtained will be found in columns headed "U. S. P. Method." The results clearly show that a large percentage of the samples examined by this method contain about 3 per cent. of hydrogen dioxide. In order to check the permanganate-sulphuric acid method for determining hydrogen peroxide and compare it with other standard methods it was decided to analyze the samples by

three additional methods, namely, the iodine method, the gasometric methods, using sulphuric acid and potassium permanganate in one and manganese dioxide and sulphuric acid in the other. In each case the hydrogen dioxide solution was measured out and weighed, as stated above, in connection with the pharmacopœial method, and aliquot parts of same employed. The iodine method proposed by Rupp* was carried out as follows:

1 gram of potassium iodide was placed in a 250-Cc. Erlenmeyer flask, 10 Cc. of 10 per cent. sulphuric acid added, and as soon as the salt was dissolved, 10 Cc. of the diluted peroxide solution 1:10 were run in by means of a burette. The flask was then covered with a watch glass and allowed to stand 30 minutes. Then about 200 Cc. of distilled water were added and the liberated iodine titrated with $\frac{N}{10}$ sodium thiosulphate solution, using starch solution as indicator. This method proved somewhat less satisfactory than the pharmacopœial method, being less rapid, and giving less concordant results. Each assay was made in duplicate, and the mean result given in accompanying table, in column headed "Iodine Method."

The samples were next analyzed by measuring the same volumes of oxygen liberated by means of manganese dioxide and potassium permanganate respectively, in the presence of sulphuric acid. It was found that Lunge's nitrometer, with a two-way stop cock did not give satisfactory results, when the reaction took place inside of the instrument. After making a number of experiments, the following apparatus and procedure were decided upon.

Manganese Dioxide Method: The apparatus consists of a 50-Cc. side arm distilling flask closed with a perforated rubber stopper through which the delivery stem of a glass-stoppered burette has previously been passed. The side arm of the flask is connected to the nitrometer by means of tightly fitting rubber tubing of any convenient length and securely wired at each end to prevent leakage. The burette is fastened loosely in a Bunsen clamp in such manner that the burette and flask can be shaken freely in one plane. The nitrometer is filled with water and the level adjusted. About 1 gram of finely powdered manganese dioxide is placed in the side arm flask and 10 Cc. of 10 per cent. sulphuric acid added. 10 Cc. of the hydrogen peroxide solution to be tested are diluted to 100 Cc. and a portion placed in the burette. After sufficient of the solution is run out to fill the delivery stem of the burette the stopper (with attached burette), is snugly fitted into the neck of the generating flask, and the level of the water in the nitrometer adjusted so as to equalize the pressure within the system. 10 Cc. of the diluted dioxide solution are then slowly allowed to run into the generator through the burette. After shaking the

* Arch. Pharm., 278—156, 1900.

flask to liberate the dissolved oxygen as completely as possible the level is again adjusted and the temperature and pressure noted. A correction of 10 Cc. (the volume of solution run into the generator), are then subtracted from the reading, and the remainder reduced to conditions at 760 mm. and 20° C.

The results obtained will be found in column headed "Gasometric Analysis, Volumes of Oxygen Evolved by MnO_4^- ." The potassium permanganate method was carried out in the manner described under the manganese dioxide method above, except that the dilute sulphuric acid and dilute hydrogen dioxide solutions were placed in a generating flask and sufficient $\frac{N}{2}$ potassium permanganate solution added from a burette to give a pink color to the solution. The results obtained by this procedure will be found in column marked "Gasometric Analysis, Volume of Oxygen Evolved by KMnO_4 ." The results obtained by the gasometric methods are fairly concordant but not as satisfactory as those with the Iodine and official methods. In general, however, the gasometric methods are less reliable than the last two named, being too dependant upon slight variation in temperature, pressure, leakage and other factors. In order to determine the rate of decomposition, the samples were re-examined for percentage of hydrogen dioxide by the pharmacopœial method at the expiration of three, six, ten and twelve months after the initial analysis. The results are recorded in the accompanying table.

After determining the percentage of hydrogen peroxide in the various brands by the methods outlined above, they were examined for preservatives, acidity, non-volatile matter, fluorides, arsenic, barium, etc.

PRESERVATIVES.

The principal labels on the packages, as well as the analytical results obtained, show that a large proportion of the hydrogen dioxide solutions contain small quantities of acetanilide. The acetanilide was determined by shaking a 50-Cc. sample of H_2O_2 twice with ether, once with chloroform, combining the several extracts in a tared beaker and drying at 75° C.

Experiments made with samples of hydrogen peroxide containing known quantities of acetanilide showed that this method removed about 95 per cent. of the amount present. The acetanilide was identified by its physical and chemical properties. The indo-phenol reaction proved to be the most satisfactory. The presence of borax and boric acid were also tested for with negative results.

A number of samples which were found to be free from acetanilide possessed a noticeable odor of aldehyde after being kept for some time. It was suspected that alcohol had been used as a preservative, but distillation from both acid and alkaline media failed to give a distillate in which alcohol could be detected by the iodoform test. By applying the method direct, however, good results were obtained. The distillate from these

gave the general reactions for aldehyde with fuchsin and sulphurous acid and with Tollen's reagent. The presence of fluoride was indicated in several products, but the results were not conclusive. Caffeine was found in several packages of one brand.

RESULTS OBTAINED IN NASHVILLE.

All of the samples were examined as to purity, quality and strength, by the pharmacopœical methods. The investigation covered two series, one begun in October, 1907, and the other in December of the same year. The several samples were re-examined at intervals of time as indicated in the table. The acetanilide was extracted by means of chloroform, it having been shown that less than one-fiftieth of a grain could be detected by the phenyl-isocyanide reaction.

NOTES BY THE AUTHORS.

As indicated above, the value of a solution of hydrogen dioxide is largely judged from the percentage on hydrogen dioxide present. The investigations were begun in October, 1907, and continued over approximately one year. The results obtained by the gasometric methods and the iodine method do not materially vary from the pharmacopœial method, and for that reason the latter method will be made the basis of comment. The Pharmacopœia states that the hydrogen dioxide solution should contain when fresh about 3 per cent. by weight of absolute hydrogen dioxide, corresponding to about ten volumes of available oxygen.

A review of the results obtained by the first examination shows that twenty-one of the samples fall below the 3 per cent. basis and eight fall below a 2.75 per cent. basis.

Experience of trade conditions leads to the belief that it is not necessary to keep hydrogen peroxide solutions on hand longer than from five to six months, the latter being the outside limit.

A review of the results obtained five and six months after the first examination shows that 24 of the samples examined lost 10 per cent. and over of the original percentage content of hydrogen dioxide, while on a 15 per cent. basis 21 were found defective, which is only 3 less than on the 10 per cent. basis. The 15 per cent. basis has therefore little to its credit. The point, however, may be raised that this commodity is less stable in warm than in cold weather. This is a cherished belief, which is, however, not well supported by this investigation. The degree of deterioration taking place during the first five and six months and between five and six months and nine and ten months, respectively, which latter covers the summer months, does not differ materially from that noted over similar periods of time in cooler weather. It should moreover be noted that these observations were made after the samples were at least five or six months old and deterioration had set in, a condition favorable for decomposition.

The results of this work undoubtedly show that acetanilide retards the deterioration of hydrogen peroxide solutions. The results, however, are not uniform. For example, two samples of hydrogen peroxide, made by the same firm, both containing acetanilide, one will deteriorate rapidly, while the other is fairly stable. What the cause of such apparent abnormalities may be, we are at present unable to determine. There are probably numerous contributing factors, but one undoubtedly is the difference obtaining in the process of manufacture. The absence of acetanilide in a number of brands and the slow rate of deterioration of some show, however, that acetanilide is not a necessary agent to prevent or retard decomposition. Hydrogen peroxide solutions containing acetanilide sooner or later develop a yellowish or brownish tint and at the same time an odor resembling nitrobenzol. A preparation so contaminated or deteriorated should no longer be dispensed or sold for medicinal purposes. To what extent the presence of nitrobenzol and similar agents are objectionable has not been established. The Pharmacopœia does not recognize the use of acetanilide as a preservative, antiseptic or otherwise, yet many packages bear labels declaring the presence of acetanilide and at the same time designate the article to be a pharmacopœial product. This is certainly inconsistent. The object of adding the acetanilide is not because of its antiseptic property, as indicated upon certain labels, but because of its apparent inhibiting influence on deterioration. The presence of acetanilide was declared in 72 samples, and found in 70. This chemical was found in 13 samples, none of the labels of which bore a statement or indication as to its presence.

ACIDITY.

The results on acidity show that a large majority of the products are excessively acid. This may be interpreted that the standard equivalent to $2\frac{1}{2}$ Cc. of $\frac{N}{10}$ sulphuric acid for 25 Cc. of the solution, is too rigid. By placing the upper limit at 3 Cc. of $\frac{N}{10}$ sulphuric acid for 25 Cc., 51 would still be excessively acid and by placing the upper at 4 Cc., 22 would still be above the limit. A certain amount of acidity may result from the oxidation or disintegration of the acetanilide present. This is a point, however, which should be provided for by the manufacturer who uses the chemical. The maximum acidity prescribed by the United States Pharmacopœia does not appear to be exacting, particularly when it is called to mind that hydrogen peroxide solutions are largely used as mouth washes. If this product should contain an excessive amount of free acid, it would of necessity exert a deleterious influence on the teeth. Numerous experiments have been made relative to determining the acidity present in hydrogen peroxide solution by the Pharmacopœia and other methods, with the results that phenolphthalein could be substituted with advantage by methyl orange. Experience and experiments furthermore show that the

free acidity can readily be determined by direct titration, using phenolphthalein as indicator. Exactly why the present pharmacopœial method for determining acidity is introduced, is not clear, neither has a satisfactory reason for its inclusion been given.

NON-VOLATILE MATTER.

The results show that a comparatively small number contain an excessive amount of solids. It appears that there should be little difficulty in properly adjusting this point, particularly in view of the fact that the majority of those containing excessive amounts of solid material are made in one and the same factory. One manufacturer states definitely that the amount of non-volatile matter is in excess of that prescribed by the Pharmacopœia. The solid material on examination was found to contain one or more of the following ; chlorides, phosphates, sulphates and acetanilide, In no case was the presence of fluorides established, but in several instances a trace of metals was noted. Tests made on the solid material show that the acetanilide was neither completely decomposed or volatilized at 120° C.

As is well known to the medical and pharmaceutical profession, hydrogen peroxide was once considered a very efficient remedy in the treatment of diphtheria, but it is now known to be virtually worthless. In spite of this fact, such statements as the following are still used ; cures quickly nose, throat and chest diseases.

Notwithstanding the fact that hydrogen peroxide solutions are known to be more or less unstable, manufacturers do not hesitate to place such statements as the following upon their labels : "Permanent," "Guaranteed unsurpassed in keeping qualities," "a permanent x x x preparation," "unsurpassed in strength and keeping qualities," "full 10 volumes strength," etc., but analysis shows that the latter is less than $\frac{2}{3}$ the standard strength. Why such statements should be used in connection with products of this character is difficult to conjecture, particularly when it is well known that they are liable to lead to trouble.

ANALYTICAL RESULTS OBTAINED IN THE EXAMINATION OF COMMERCIAL BRANDS OF HYDROGEN PEROXIDE, WASHINGTON, D. C.—(WARREN.)

Number.	Acetanilide.		Acidity calculated as H_2SO_4 to for 55 Cc.	Solids in 50 Cc.	Gasometric analysis (Volume of oxygen evolved at 30°C., 760 Mm. by).		U. S. P. method—Per cent. of hydrogen dioxide present.					Loss in 6 months.	Loss in 1 year.
	Amount declared, grains per ounce.	Amount found, grains per ounce.			Iodine method.		Initial examination.	After 3 months.	After 6 months.	After 10 months.	After 12 months.		
					MnO ₂ .	KMnO ₄.								Cc.	Cc.
1	1-6	.07	3.50	.0645	9.85	9.80	2.78	2.85	2.88	2.78	2.69	+1.05	5.65
2	1-6	.09	3.60	.0615	9.50	10.00	2.78	2.84	2.75	2.58	2.43	1.09	10.99
3	1-6	.14	2.60	.0183	11.17	11.08	3.18	3.28	3.24	3.14	3.14	1.21	3.18
4	1-6	.10	2.50	.0180	11.15	11.39	3.30	3.21	3.23	3.18	3.14	1.62	2.18
5	1-16	.11	2.1	.0138	10.99	10.67	3.06	3.08	3.08	3.03	2.99	1.32	3.05
6	1-16	.11	2.0	.0136	10.79	10.81	3.05	3.07	3.09	3.02	2.97	1.05	3.25
7	1-8	.14	2.3	.0435	10.70	10.65	3.03	3.07	3.05	2.98	2.92	1.05	4.82
8	1-8	.13	2.4	.0413	10.69	10.45	3.01	3.07	3.06	2.96	2.92	1.05	4.92
9	1-8	.07	2.7	.0373	10.40	10.40	2.94	2.98	2.96	2.70	2.64	2.01	10.60
10	1-8	.08	2.8	.0404	10.45	10.45	2.98	2.98	2.96	2.70	2.64	1.07	14.37
11	3-16	.09	1.5	.0085	11.05	10.80	3.07	3.1	3.09	3.09	3.04	.64	9.90
12	3-16	.10	1.45	.0085	10.75	10.51	3.11	3.11	3.13	3.09	3.04	.64	2.19
13	None.	None.	5.75	.0133	8.15	8.43	2.31	2.31	1.46	1.46	.68	36.79	70.05
14	None.	None.	4.95	.0324	8.17	8.07	2.37	2.38	1.53	.99	.64	60.44	70.44
15	None.	None.	2.80	.0374	10.70	10.82	3.03	3.03	2.99	2.86	2.83	1.96	7.21
16	1-8	.14	2.60	.0378	11.04	10.56	3.03	3.06	2.99	2.80	2.73	1.98	2.44
17	1-8	.12	2.40	.0399	10.67	10.58	3.02	3.03	2.97	2.80	2.73	1.98	10.03
18	1-8	.08	2.90	.0374	10.67	10.67	3.01	3.02	2.85	2.43	2.38	2.31	3.41
19	.0004	.15	2.40	.0142	10.65	10.73	3.05	3.08	3.07	3.09	2.97	3.41	3.08
20	.0004	.13	2.40	.0153	10.67	10.38	3.05	3.08	3.09	3.02	2.98	3.08	3.08
21	3-16	.08	3.60	.0169	10.87	10.57	2.99	3.03	3.02	2.96	2.84	3.3	6.19
22	3-16	.09	3.15	.0171	10.87	10.40	2.99	3.03	3.02	2.92	2.88	3.3	5.17
23	3-16	.10	2.8	.0178	10.67	10.40	3.02	3.04	3.03	2.90	2.90	3.2	4.67
24	3-16	.08	3.3	.0191	10.30	10.34	3.02	3.01	3.04	2.91	2.86	3.66	5.00
25	3-16	.15	2.6	.0191	10.30	10.37	3.05	3.08	3.09	3.02	2.99	3.15	3.15
26	3-16	.10	2.7	.0119	10.37	10.47	3.05	3.08	3.09	3.00	2.97	3.41	3.15
27	12-100	.08	3.0	.0404	10.19	10.21	3.01	3.17	3.03	2.96	2.90	4.41	4.41
28	12-100	.06	3.05	.0454	10.58	10.38	3.05	3.09	3.05	2.96	2.90	3.8	6.15
29	12-100	.13	3.55	.0182	10.37	10.33	3.04	3.07	3.05	2.96	2.90	3.8	6.15
30	1-10	None.	3.0	.0165	10.36	10.38	3.08	3.18	2.96	2.94	2.90	3.8	6.15
31	1-10	None.	2.15	.012	10.43	10.10	3.08	3.03	2.97	2.94	2.90	3.8	6.15
32	1-10	None.	2.50	.0034	10.34	10.45	3.01	3.03	2.97	2.94	2.90	3.8	6.15
33	1-10	None.	2.80	.0053	10.72	10.66	3.00	3.04	2.97	2.94	2.90	3.8	6.15
34	1-10	None.	2.45	.0038	10.22	10.68	3.00	3.00	2.99	2.90	2.86	3.8	6.15
35	1-10	None.	5.5	.0181	13.45	13.45	3.00	3.00	2.99	2.90	2.86	3.8	6.15
36	1-10	None.	6.4	.0169	13.67	13.67	3.00	3.00	2.99	2.90	2.86	3.8	6.15
37	1-10	None.	6.2	.0164	13.92	13.83	3.00	3.00	2.99	2.90	2.86	3.8	6.15
38	1-10	None.	6.9	.0165	13.80	13.77	3.00	3.00	2.99	2.90	2.86	3.8	6.15
39	1-10	None.	10.70	.0165	24.30	24.31	7.04	7.12	5.78	4.82	4.73	18.01	37.60
40	1-10	None.	9.30	.0200	24.45	24.74	7.06	7.12	5.91	4.96	4.61	16.99	35.36

* Bottle exploded between 3-31 and 6-30.

† No denomination given on label.

ANALYTICAL RESULTS—WARREN.—Continued.

No.	Acetanilide.		Acidity calculated as N H ₂ SO ₄ for 25Cc.	O % in solid	Gasometric analysis (Volume of oxygen evolved at 20° C., 760 Mm. by).		Iodine method.	U. S. P. method—Per cent. of hydrogen dioxide present.					Loss in 6 months.	Loss in 2 year.
	Amount declared, grains per ounce.	Amount found, grains per ounce.			MnO ₂ Cc.	KMnO ₄ Cc.		Initial examination.	After 3 months.	After 6 months.	After 10 months.	After 12 months.		
41	None.	.05	Cc. 3.85	Gram. .073	Cc. 9.93	Cc. 9.01	\$ 2.89	\$ 2.89	\$ 2.89	\$ 2.87	\$ 2.88	\$ 2.69	\$.69	6.99
42	"	.06	3.00	.0229	9.80	9.07	2.79	2.89	2.89	2.84	2.76	2.72	.69	4.48
43	"	.07	2.80	.0195	10.70	10.74	3.03	3.07	3.10	3.10	2.96	2.91	+	3.75
44	"	.10	2.45	.0114	10.70	10.74	3.05	3.10	3.08	3.00	3.02	3.01	+	3.40
45	"	.06	2.80	.0124	10.78	10.74	2.05	3.08	3.10	3.00	3.04	3.01	+	3.00
46	"	.06	2.80	.0119	10.60	10.67	3.03	3.09	3.09	3.11	3.02	2.90	+	2.97
47	Trace.	"	2.80	.0077	10.47	10.55	2.95	3.03	3.09	2.85	2.41	2.20	2.04	27.28
48	1-10 max.	"	2.75	.0156	10.17	9.65	2.85	3.02	3.09	2.83	2.19	2.04	2.07	29.48
49	3-16	.06	2.30	.0157	10.40	10.68	2.99	3.02	3.03	3.03	2.93	2.86	.00	5.39
50	3-16	.08	2.80	.0166	10.16	10.13	3.02	3.04	3.05	3.04	3.13	3.40	.25	5.37
51	None.	"	1.85	.0094	11.85	11.88	3.56	3.50	3.58	3.54	3.36	3.32	.83	7.10
52	"	"	2.75	.0086	12.61	12.22	3.57	3.58	3.58	3.52	3.49	3.42	1.67	4.46
53	"	"	2.10	.0091	12.35	12.34	3.49	3.58	3.58	3.52	3.48	3.41	....	4.93
54	"	"	1.70	.0111	10.34	10.20	3.56	3.59	3.64	3.59	2.89	2.83	+	4.32
55	3-16	.11	2.35	.0147	10.34	10.20	2.94	3.06	2.97	2.95	2.88	2.83	.67	4.98
56	3-16	.11	2.40	.0109	10.70	10.11	2.99	2.97	3.01	3.00	2.93	2.90	.33	3.35
57	3-16	.14	3.25	.0149	10.33	10.18	2.98	3.01	3.01	3.01	2.94	2.91	.08	3.63
58	3-16	.18	4.05	.0111	9.84	9.86	3.02	3.04	3.01	2.99	2.94	2.91	.98	3.76
59	3-16	.13	3.00	.0129	10.11	10.16	2.93	2.99	3.02	2.99	2.91	2.86	.00	4.30
60	1-18	.11	3.00	.0098	10.57	10.66	3.12	3.10	3.12	3.12	2.91	2.72	8.77	40.50
61	3-16	.09	3.80	.0106	10.66	11.15	3.21	3.20	3.12	3.12	2.82	2.48	2.80	44.52
62	3-16	.09	3.80	.0106	10.66	11.15	3.15	3.21	3.18	3.12	2.82	2.48	2.80	44.52
63	3-16	.09	4.40	.0181	10.91	10.71	3.15	3.21	3.18	3.12	2.82	2.48	2.80	44.52
64	3-16	.09	3.80	.0181	10.91	10.71	3.15	3.21	3.18	3.12	2.82	2.48	2.80	44.52
65	3-16	None.	4.00	.0020	14.68	14.53	4.24	4.27	4.28	4.27	4.24	4.21	3.10	34.32
66	3-16	"	3.85	.0182	14.01	14.01	4.18	4.26	4.26	4.26	4.26	4.26	2.39	37.86
67	None.	"	2.8	.0166	10.91	10.91	3.34	3.45	3.37	3.38	2.76	2.50	21.39	41.95
68	"	"	2.8	.0166	10.91	10.91	3.34	3.45	3.37	3.38	2.76	2.50	21.39	41.95
69	"	"	2.8	.0166	10.91	10.91	3.34	3.45	3.37	3.38	2.76	2.50	21.39	41.95
70	"	"	2.8	.0166	10.91	10.91	3.34	3.45	3.37	3.38	2.76	2.50	21.39	41.95
71	3-25	.13	3.5	.0175	11.77	11.74	3.33	3.45	3.37	3.38	2.76	2.50	21.39	41.95
72	3-25	.12	7.4	.0131	11.68	11.74	3.33	3.45	3.37	3.38	2.76	2.50	21.39	41.95
73	.....	.11	4.7	.0094	11.00	10.99	3.17	3.16	3.15	3.14	2.99	2.86	9.32	29.49
74	"	.10	2.00	.0043	10.64	10.64	3.03	3.07	3.03	3.03	2.98	2.86	1.94	15.34
75	3-16	.09	4.50	.0195	11.25	11.27	3.27	3.28	3.28	3.28	2.95	2.82	1.30	6.22
76	3-16	.06	4.00	.0135	10.00	10.17	2.95	3.01	3.04	3.00	3.21	3.18	+.91	4.39
77	3-16	.06	3.05	.0115	10.11	10.18	2.91	3.01	3.04	2.89	2.76	2.69	+.33	8.03
78	3-16	.06	3.20	.0102	10.78	10.99	2.95	3.01	3.04	2.95	2.86	2.74	1.99	9.04
79	3-16	.10	3.70	.0146	10.57	10.71	3.09	3.09	3.05	3.04	2.98	2.91	+.66	8.04
80	3-16	.10	3.70	.0146	10.57	10.71	3.09	3.09	3.05	3.04	2.98	2.91	+.66	8.04

Per cent.

ANALYTICAL RESULTS OBTAINED IN THE EXAMINATION OF COMMERCIAL BRANDS OF HYDROGEN PEROXIDE, NASHVILLE, TENN.—(RUDDIMAN.)

Acetanilide.		Acidity calculated as N H ₂ SO ₄ to for 25 Cc.	Total solids in 20 Cc.	U. S. P. method.—Per cent. of hydrogen dioxide present at end of							Per cent. loss in 5 months.	Per cent. of loss in 9 months and in one year.			
Declared.	Found.			October.	November.	December.	January.	March.	May.	July.			Sept.	October.	
Grains per ounce.		Cc.	Grams.												
1	3-6	Present.	3.9	.0211	...	...	...	2.87	2.70	2.75	2.68	2.60	...	3.13	8.3
2	1-6	"	2.7	.0161	...	...	3.32	3.31	3.28	3.20	3.24	3.23	...	1.86	2.3
3	3-16	"	2.0	.0116	...	...	3.11	3.08	3.08	3.07	3.05	3.03	...	1.98	2.5
4	1-8	"	3.0	.0411	...	...	3.15	3.02	3.08	3.05	3.00	2.99	...	3.17	5.0
5	3-8	"	3.2	.0330	...	...	3.04	3.02	2.98	2.91	2.86	2.74	...	1.58	9.7
6	3-16	"	2.5	.0279	...	...	3.16	3.15	3.13	3.11	3.09	3.08	...	2.76	5.2
7	None.	None.	4.0	.0112	...	...	3.12	3.09	3.07	3.03	3.01	2.99	...	26.03	51.8
8	"	Present.	3.9	.0304	...	...	3.11	3.08	3.05	3.01	2.97	2.95	...	3.21	5.4
9	1-8	"	3.3	.0365	...	...	3.11	3.08	3.07	3.04	3.03	3.02	...	10.9	12.2
10	1.0004	"	2.0	.0002	...	...	3.18	3.15	3.13	3.11	3.09	3.08	...	2.20	3.3
11	3-16	"	3.4	.0100	...	...	3.14	3.11	3.10	3.07	3.05	3.04	...	2.23	7.2
12	3-10	"	3.4	.0433	...	...	3.11	3.11	3.06	3.04	3.03	3.02	...	2.93	4.9
13	3-12	"	3.3	.0122	...	...	3.13	3.11	3.06	3.04	3.03	3.02	...	2.87	7.9
14	None.	None.	9.5	.0173	...	...	7.97	6.98	6.35	5.99	5.21	4.59	...	17.60	36.8
15	"	Present.	5.1	.0157	...	...	2.89	2.88	2.87	2.85	2.81	2.79	...	...	...
16	1-10	Trace.	2.0	.0250	...	...	2.88	2.81	2.76	2.65	2.43	2.21	...	1.38	3.6
17	3-16	Present.	2.1	.0240	...	...	3.08	3.00	3.03	3.02	2.99	2.96	...	8.68	23.1
18	3-16	"	2.6	.0120	...	...	3.02	3.00	2.98	2.95	2.93	2.92	...	1.94	3.8
19	3-16	"	5.6	.0326	...	...	4.68	4.5	3.93	3.45	3.49	3.48	...	2.31	3.4
20	3-25	"	7.6	.0388	...	...	3.43	3.42	3.40	3.45	3.40	3.38	...	30.55	62.0
21	None.	"	3.3	.0380	...	...	3.11	3.11	3.09	3.08	2.98	2.98	...	2.47	7.8
22	"	"	4.0	.0164	...	...	3.45	3.43	3.42	3.38	3.35	3.32	...	2.9	6.2
23	"	"	2.5	.0101	...	...	3.06	3.05	3.01	2.99	2.95	2.87	...	2.03	3.7
24	3-16	"	2.8	.0390	...	...	1.91	1.88	1.74	1.60	1.42	1.27	...	2.86	7.2
25	None.	"	2.6	.0100	...	...	2.94	2.89	2.83	2.80	1.63	1.37	...	9.84	37.4
26	"	"	6.6	.0242	...	...	.06	0.4	.03	.02	.01	...	...	17.34	56.9
27	"	Present.	2.7	.0133	...	...	3.09	3.09	3.00	3.03	2.99	2.97	...	50.00	98.6
28	"	"	4.0	.0368	...	...	2.89	2.79	2.86	2.85	2.82	2.81	...	2.95	1.2
29	...	...	...	...	...	...	...	...	...	...	...	...	...	20.54	72.7
30	1.142	Present.	3.0	.0508	...	...	2.98	2.95	2.93	2.84	2.78	2.72	...	3.02	0.8
31	None.	None.	2.4	.0105	...	...	2.30	2.20	1.92	1.60	1.20	1.00	...	7.4	68.9
32	3-16	Present.	2.8	.0162	...	...	2.75	2.74	2.69	2.68	2.62	2.55	...	3.27	10.1
33	.018	None.	7.8	.0268	...	...	2.45	2.35	2.27	2.05	1.75	1.21	...	19.60	75.7
34	None.	"	1.3	.0136	...	...	2.47	2.43	2.08	1.86	1.65	1.05	...	10.93	39.5
35	3-16	Trace.	2.5	.0203	...	...	2.97	2.91	2.82	2.80	1.52	1.22	...	21.21	62.0
36	None.	"	2.9	.0193	...	...	.32	.26	.24	.20	1.16	1.14	...	28.12	63.4

* No denomination given.

MR. FRANCIS: Mr. Chairman, I don't know that I would offer anything on this subject, but for the fact that I have been very much interested in hydrogen peroxide for about three years, and this fact, and the further fact that I have indirectly devoted a great deal of study to the principles involved in the manufacture of hydrogen peroxide, and also a very close and constant study of a comparison of all the various brands of peroxide manufactured in the United States and abroad, as well; and this shall be my excuse for imposing upon your time for a few moments.

We can all remember when hydrogen peroxide was manufactured by the retail druggist, in very small quantities, and sold by him at what we would now regard as an exorbitant price, for the very good reason that it decomposed from the very moment of its production. Hydrogen peroxide is now used in enormous quantities; there is enough produced in the United States every year to float the "Lusitania." Whether this very wide use of it by the laity is wise, I will not offer an opinion. It is sold in practically every retail store in the country, so the matter of the life or preservation of hydrogen peroxide is a live topic, from the standpoint of the retail druggist. What we have learned of the necessary conditions surrounding the production of hydrogen peroxide has been of very great value in increasing the stability of this product, so that it can now be logically regarded as an article of commerce, and can be shipped and distributed economically, and at a reasonably economical price. There still remains a great deal to be learned about it—a great deal—more than we know at the present time. One of the most interesting things, of course, would be the study of a preservative, which would delay the decomposition of the hydrogen peroxide, and it was discovered a few years ago that the most potent factor to prevent this decomposition was acetanilide. A great many substances have been proposed, and I find to my astonishment that some chemists, who ought to know better, who have written dissertations on the subject, have quoted from statements made as far back as thirty, forty and fifty years ago by German chemists, French chemists, English chemists and various other chemists, recommending boric acid, and in some cases borax, magnesia and other similar soluble salts—the veriest nonsense that any man ever embodied in an argument, I think. Of course we know that any alkali leads to the decomposition of peroxide. We know that its stability is in almost direct proportion to the excess of free acid. We do know—at least I feel that I know, from investigation, that the presence of most of the insoluble salts has practically no effect whatever on the stability of hydrogen peroxide. The one potent factor, however, is the presence of metals. I think I am correct in saying that the most potent is copper. Iron cannot be eliminated altogether, but it is also very potent. Iron is found in the ordinary materials employed in its manufacture, in some degree, and it is impossible to remove every trace of the iron.

Now as regards the matter of acetanilide, it would of course be desirable if hydrogen peroxide could be marketed without acetanilide or any extraneous matter whatever. The hydrogen peroxide made by the best methods, and as pure as is practicable, will under ordinary circumstances retain its full strength for six months or longer; at the same time the life of hydrogen peroxide can be extended under ordinary conditions to twelve months, and sometimes eighteen months, by the use of a small portion of acetanilide, so small that a man would have to swallow a great amount of hydrogen peroxide in order to get an ordinary dose of acetanilide.

I do not think there is any sense whatever in any one making the claim that acetanilide should be added to hydrogen peroxide because of its antiseptic effect; it is used in too small quantities, although it is well known to physicians and surgeons that acetanilide applied is a very good germ destroyer. It has been used very much in the powdered form, but its use is objectionable on account of the danger of over oxidation. But I want to make this statement in closing my remarks, that taking any hydrogen peroxide, regardless of its quality, the life of that particular grade of peroxide will be doubled by

the addition of a minute quantity of acetanilide. Now I have not the proof of that assertion to offer you to-day, but I will be very glad to publish it, and shall do so in the next few months, as the result of a long series of careful experiments and comparative tests, made for a period extending back nearly four years. I can not make that statement too emphatic—it has its preservative effect irrespective of the quantity used.

MR. REMINGTON: I do not want to ask impertinent questions, but I would like to have Dr. Francis tell us about the decomposition. Now there is a period, is there not, when, with the addition of acetanilide, there is no odor whatever? But I would like to ask, when that odor appears, is that an indication that the hydrogen peroxide itself is deteriorating, and does that mean that that decomposition goes on, and that acetanilide ceases then to be a preservative?

MR. FRANCIS: Very largely so. As oxygen is given off by the decomposition of the hydrogen peroxide; it attacks the acetanilide; I think I am correct in the statement that a certain amount of color is produced. If decomposition has progressed to a sufficient extent it will produce a little color, and I should say when hydrogen peroxide develops a distinct odor or color, it should not be used or dispensed. But I would also supplement that with this further assertion, that there is no power under heaven, so far as we know now, that will prevent the decomposition of hydrogen peroxide sooner or later, and that it is better for the druggist, or the physician or the layman to be placed on his guard, and not to dispense or to use hydrogen peroxide which has developed an odor, than it is for him to dispense or to use a bottle containing nothing but water, and from which all the oxygen has passed off by the evolution of gas. In other words, I would look upon this preservative as having the further effect of a safe-guard to prevent the use of a deficient hydrogen peroxide.

MR. C. E. CASPARI: In connection with the oxidation of acetanilide by hydrogen peroxide, I think there is some process of oxidation that is not entirely understood yet, because I have frequently seen samples of peroxide which apparently, as far as we knew, were identical in every respect, as to age, and quantity of acetanilide contained in them and yet in the same period of time some of these would develop the odor of nitrobenzene, and become yellow, while others would not. What the reason of that is, I do not know, but it shows that there is something there which is not clearly understood, concerning the oxidizing power of peroxide on acetanilide.

MR. KEBLER: My opinion coincides with Mr Caspari's on the question of the oxidation of acetanilide.

THE CHAIRMAN: The next paper is entitled "Physiologic Standardization of Cardiac Stimulants and Depressants," by Dr. T. Stotesbury Githens; this paper will be presented, together with a comparison of such standardization, with some results obtained by chemical assay, by Mr. Charles E. Vanderkleed.

Mr. Vanderkleed here presented Dr. Githens' paper, as well as his own.

PHYSIOLOGIC STANDARDIZATION OF CARDIAC STIMULANTS AND DEPRESSANTS.

BY THOMAS S. GITHENS.

TOGETHER WITH A COMPARISON OF SUCH STANDARDIZATION WITH
SOME RESULTS OBTAINED BY CHEMICAL ASSAY.

BY CHAS. E. VANDERKLEED.

In spite of the large amount of physiological work which has been done with the vegetable drugs in order to determine the method by which they

act and the organs and processes which are first and most markedly affected, we find very little in the literature in regard to determination of the strength of these drugs or the amount required to produce certain effects. In the text books on therapeutics we find a distinction drawn between the effects of "small" and of "large" or "toxic" doses on the various animals used for experimental purposes, but very rarely do we find any exact statement as to what amount of the drug per gram of animal constitutes such a dose.

For this reason it has seemed interesting as well as important to determine the exact amount of various drugs which were required to produce definite effects in laboratory animals and to determine also which method of testing was best suited to each drug.

Commercially this study is of importance on account of the desire of manufacturers of these drugs and their products to put on the market preparations of definite physiologic strength, from drugs the chemical study of which is not a criterion of activity. My studies have been largely limited to such drugs for this reason.

The drugs whose standardization I will consider are Apocynum, Aconite, Convallaria, Digitalis, Gelsemium, Scilla, Strophanthus, and Veratrum. These drugs fall into two groups; those which raise blood pressure, the so-called digitalis series, Apocynum, Convallaria, Digitalis, Scilla, and Strophanthus; and those which lower blood pressure, Aconite, Gelsemium, and Veratrum.

We will consider, first, the drugs of the digitalis series. Three methods are available for the purpose of quantitative determination of their activity.

1. The effect on the isolated heart of the frog or turtle.
2. The effect on the blood pressure.
3. The amount required to cause death.

As the effect on the heart is that which makes these drugs useful in practical medicine, it is often stated that the best method of testing them is directly on the heart. The effect on this organ can be studied to the exclusion of all other factors by the following method. The heart of a frog or turtle will continue to beat, if it is placed in a solution of the proper salts, after its removal from the body. If the heart is cut into longitudinal strips, each of these will continue to beat under proper conditions, and may live for two or even three days after removal from the body. It would seem that by adding the drug to be tested to the liquid in which the strips were suspended, the effect of this on the heart itself might be determined with great accuracy. This would be true but for the fact that organs isolated from the body and kept under artificial conditions are very susceptible to slight alterations in their surroundings—so much so, that if four strips are cut from the same heart and are kept under apparently identical conditions, they may show great differences among themselves, and although the

effect of the addition of a given drug to the solution might easily be seen in the alteration of the rhythm, the differences between the reaction of different strips would be greater than that between different specimens of the same drug. In work of this sort which I have done, I found that the difference in the effect of a given quantity of a drug and twice this amount was not very marked, although there was generally a fairly marked difference between a given amount and four times as much. A method which gives results showing a variation of 50 per cent. in one direction or the other can of course not be depended on for quantitative standardization.

The second method, the effect on the blood pressure, has also something in its favor, inasmuch as the stimulating effect of these drugs on the heart is in more or less direct proportion to the effect on the blood pressure. If the effect of drugs on the blood pressure is studied, it will be found that the rise following an injection is not in proportion to the dose given. A small dose will cause a perceptible rise, but twice this dose will not cause twice this rise. In fact, we find that a certain dose brings about almost a maximal rise and that increasing the dose will merely increase toxic phenomena, so that the pressure will fall more rapidly than after the smaller dose. The effects of large and small doses are thus distinguished with difficulty and the same is *pari passu*, true of equal doses of strong and weak preparations. It is evident from these facts that if we choose as our standard dose the smallest amount which will bring about a maximum rise, a drug much stronger than our standard will cause much the same rise but will, through its toxic action, cause to fall sooner than would a weaker preparation, and thus a strong preparation will appear weak instead of strong.

To avoid this tendency to toxic action it will be necessary to give a dose, of the preparation to be tested, so small that there is no danger of overstepping the bounds of normal physiological action however strong the specimen in hand. The use of so small a dose betrays us unfortunately from the Scylla of toxic action to the Charybdis of uncertain reaction. It is a well-known fact of physiology, that the stronger the stimulus the more nearly in accord are the results obtained on different individuals. This is particularly true of drug action. If a sixteenth of a grain of morphine be given to each of a series of persons, it will cause sleep in this person, nausea in that, wakefulness in a third, and perhaps headache in a fourth. If however several grains are given to the same persons, it will cause narcosis in all. The same difference in reaction to small doses of medicine is seen in the effect of blood-pressure-raising drugs on different individuals. For this reason it is necessary to give first to the animals on which the tests are being carried out, a dose of a standard preparation, and then to determine how much of the preparation to be tested is required to bring about the same rise. The elimination of most drugs is so slow as to render this method valueless. With the exception of such drugs as amyl

nitrite, which are eliminated within a few minutes, and adrenal principle, which is destroyed as rapidly, the effect of the first dose cannot, under the ordinary conditions of experiment, be allowed to pass off entirely before the next dose is administered, and there is for this reason a cumulative action, each dose adding to the effect of the previous one, and rendering a true comparison impossible.

We thus come by a process of exclusion to the third method, the determination of the amount of a drug required to cause death. This amount is ordinarily determined by injecting into a series of animals, progressively larger doses of the drug under consideration, and noting the smallest dose required to cause death. The method is therefore known as the minimal lethal (fatal) dose method. A large series of experiments show that by basing the dose on the weight of the animal, the activity of the preparation can be determined to within 10 per cent. That is to say, if a given dose is the smallest which will kill a given animal, eleven-tenths of this amount will kill almost any individual of the same species, and nine-tenths of this amount will hardly ever kill. This fact bears out what has been said above concerning the agreement in the effects of large doses.

Granting then that the method gives concordant results, can we be at all sure that the toxic power which is estimated in this way is in accord with the therapeutic activity of the preparation? The physiological action of these drugs, on which their therapeutic value depends, is mainly a stimulation of the heart, shown by more forcible contraction of its wall. The drugs kill either by inducing a state of constant contraction (death in systole) or by overworking the heart muscle to such an extent that it gives way to a more or less sudden exhaustion with relaxation (death in diastole). In either case, the effect is primarily due to stimulation of the heart, and thus varies in accord with the physiologic or therapeutic activity. In this connection it may be as well to mention that occasionally in mammals, respiration ceases before the heart has come to a standstill. This does not indicate any direct action of the drug on the respiratory centers, but is due to interference with the function of the medulla, dependent on the disturbance of its blood supply. The death is thus due to the stimulating action on the heart, however it may eventually occur. Granting then that the lethal-dose method is not only exact, but also determines the physiological activity, what animal is the best to use? It is often stated that as the drug acts on the medulla in mammals, as shown by respiration occasionally ceasing before the cardiac contractions, the drugs should be tested on frogs, in which it acts on the heart. As we have seen, the respiratory failure is really due to beginning cardiac exhaustion, and in reality there is no essential physiological difference between the action of the drugs on the frog and on the guinea pig. The action of digitalis is largely exerted on the cardiac ganglia. In the frog these ganglia are in the heart, as may be demonstrated by the continuance of contractions after the removal of

the organ from the body. In birds they are in the spinal cord, as is shown by the cardiac action continuing after the head is cut off. In mammals, however, the cardiac ganglia are in the base of the brain and any stimulus acting on these ganglia acts of course on the brain.

The frog is an unsatisfactory animal for the purpose of standardization, as its reaction to stimulation is markedly influenced by external surroundings, temperature, amount of moisture present in the cage, relation of time of injection to time of feeding, etc. The species of frog also makes a difference and, according to many authors, the time of year. Certain writers believe that season has of itself no influence, but that the differences found are dependent on different species being used, or on temperature. Although the uncertainty arising from these factors may be avoided by great care, there will be a difference in different lots of frogs, and it is recommended by those who use the frog method, that a standard preparation of each drug be kept on hand and that each fresh batch of frogs be studied as to their relation to the standard before they are used for the purpose of testing new preparations. This makes the standard dependent on the keeping properties of a stock galenical, and these are exceedingly uncertain in many drugs. Any deterioration will result in a lowering of the standard for all subsequent preparations. For these reasons it seems wiser to use some animal which shows no such variation, is always of the same species, can be easily obtained, and is large enough to allow accurate and easy calculation and measurement of doses. The guinea pig fulfills all of these requirements, and has therefore been selected by us for use in our experiments, moreover, as the guinea pig is very resistant to the action of alcohol, it is not necessary to evaporate alcoholic preparations to dryness before injecting them. The necessity for such evaporation when using frogs is of course well known.

It is a noteworthy fact, to which attention has often been directed, that the smaller animals require doses much larger in proportion of their weight. For instance, 0.75-Cc. tincture of digitalis which can be given safely to a 250-gram guinea pig, would correspond to 7.2 oz. to a 250-pound man, which would be far above a fatal dose. It has therefore been proposed that the dose should be based on the relative surfaces of the animals instead of on their weight. This would be the two-third power of the weight. (The square of the cube root). This would give a dose of little more than 1 oz. to a 150-pound man, which is about the largest dose which can be given safely. A series of experiments on guinea pigs of different weight, have shown that this argument does not apply to them. Comparing pigs of about 225 grams weight with others of 500 grams, we find that upwards of twice as much is required to kill the larger animals. This shows that for animals of the same species the dose should be in proportion to the weight and not in proportion to the surface area.

In doing the routine work of standardization, the guinea pigs are first

weighed, and then to one pig is given hypodermically the standard minimal lethal dose, to a second nine-tenths of this, and to a third eleven-tenths. If the drug is of proper strength, the two pigs receiving the larger doses will die, while the third will recover. This being the case, the drug or preparation may be passed as it is. If only the pig receiving eleven-tenths dies, the preparation is to be concentrated 10 per cent. If all three pigs die, a fresh pig is given eight-tenths of the standard dose and the dose is reduced by tenths until a pig lives. The preparation is then diluted accordingly. If all three pigs live, a fresh pig is given twelve-tenths, and others increasing doses until two die. The preparation is then concentrated to agree with the smallest amount received by a pig which is killed.

By this method it is possible to make preparations which are always within 10 per cent. of the same strength.

The standards on which I have decided after a large amount of work with preparations from different houses, are as follows :

DOSE BASED ON A 250 GRAM GUINEA PIG, AND PROPORTIONED TO WEIGHT IF THE PIG USED DOES NOT WEIGH THIS.

Drug.	Fluidextract.	Tincture.	Extract.
Apocynum.....	0.075 Cc.	0.75 Cc.	
Convallaria.....	0.075 Cc.	0.75 Cc.	
Digitalis.....	0.1 Cc.	1.0 Cc.	0.025 Gm.
	1890. 1900.		
Scillae.....	0.25 Cc. 0.5 Cc.	0.75 Cc.	
Strophanthus.....	0.0025 Cc.	0.025 Cc.	

The most interesting point in connection with this table is the peculiar difference in the activity of the three preparations of squill. The alcoholic extract is about twice as strong as the acetic, or a little more, and the tincture about three times as active as the alcoholic extract ; in proportion to drug strength.

We now turn to the consideration of the *heart depressants*. There are only three vegetable drugs in the Pharmacopœia whose most important physiological action is a direct depression of the cardiac activity,—these being aconite, gelsemium and veratrum. Related to these in action is a group of drugs which exert their most marked action on the voluntary muscles, causing loss of tone in these, and killing by respiratory, rather than cardiac failure. This group includes physostigma, lobelia and conium. The drugs of the digitalis series, which kill by depression resulting from over-stimulation, show a very sharp line between their therapeutic and toxic doses. A dose slightly less than that which is required to cause death, causes only slight toxic phenomena. With the drugs of this class, on the contrary, the toxic symptoms are manifested even under the influence of comparatively small doses and these increase gradually until death

is reached. For this reason, the dosage of these drugs is not as sharply defined as that of the drugs previously considered, and it is necessary, in making a standard for these drugs, to arbitrarily fix a period of time within which the animal must die, if the drug is to be considered up to standard. This period has been fixed as three hours, as we have found that ordinarily a dose which will eventually prove fatal will do so within this time.

The heart depressants differ from the drugs of the digitalis series in another respect, each of them producing evident effects when given in sublethal doses. Aconite causes in many cases, nausea, which is shown in the guinea pig by violent retching. As far as our observations are concerned, this animal never vomits. The irritant effect is also shown by the tendency of this drug to cause diarrhœa.

Gelsemium is likely to cause convulsions and these are frequently followed by paralysis, even in cases in which the animal eventually recovers. The guinea pig poisoned with gelsemium lies on the side, moving the legs feebly from time to time and breathing irregularly, and frequently only at long intervals. This paralysis may not come on until an hour or so after the administration of the drug and in this case, recovery is likely to take place. If the paralysis occurs within twenty minutes of the time the drug is administered, the dose will generally prove fatal.

Veratrum stands between aconite and gelsemium in regard to these phenomena, causing convulsion less frequently than the latter, but being very likely to cause paralysis. Retching and diarrhœa, although not so common as with aconite, are frequently seen. It might be mentioned in this connection that, of the drugs spoken of in the previous article, apocynum frequently causes paralysis, even in animals which eventually recover, and squill and convallaria often cause convulsions. Digitalis is much freer from these sublethal toxic phenomena.

The drugs which have been mentioned as causing death by failure of the respiration can all be standardized by chemical means, as their activity is largely dependent upon their alkaloidal content, although aconite, gelsemium and veratrum contain alkaloids on which their activity depends, their physiological strength does not necessarily nor invariably vary in accordance with their total alkaloidal content. The physiological activity of aconite is mainly due to the aconitine which it contains, but this alkaloid contains in chemical combination a methyl and a benzoyl group, either of which may be split off during the handling of the drug and the loss of which renders the aconitine inactive, while still permitting it to respond to the chemical reactions of an alkaloid. This is particularly prone to occur on long standing of its preparations. Veratrum contains, in addition to veratrine, a series of alkaloids, among which may be mentioned protoveratrine, veratroidine and protoveratridine, which are almost entirely inactive, but which cannot be easily distinguished chemically from

the active alkaloids. Gelsemium contains two alkaloids, gelsemine and gelseminine, the former of which has practically no effect on mammals, but cannot well be distinguished by any chemical assay process. On account of the possibility, therefore, of obtaining misleading results from chemical assay alone, we are reduced to the necessity of substantiating such assays by physiological means. Conium, physostigma and lobelia all contain alkaloids upon which their pharmacologic and therapeutic activity depends, and the amount of which gives a direct indication of the therapeutic activity of the product. It is therefore not considered necessary to standardize these products physiologically.

After a large number of experiments extending over several months, the following standards have been adopted for the three drugs first mentioned. In each case the amount mentioned is injected subcutaneously into a guinea-pig, and other pigs are given respectively $\frac{1}{10}$ and $\frac{1}{100}$ of the standard dose. If all three of these doses prove fatal, a smaller dose is given to a fresh pig; if none prove fatal, a larger dose is given to a fresh pig. If the dose given in the table proves fatal within three hours, and the pig receiving $\frac{1}{10}$ of this lives longer than this period, the drug is considered to be of standard quality. The doses given in the table are based on 250-gram pigs, and in case the pig weighs more or less than this amount, are made proportionate to its weight. The dosage is given in grams of the drug and extract and in cubic centimeters of the liquid preparation.

Preparation.	Drug.	Fluidextract.	Tincture.	Extract.
Aconite Root.....	0.0100	0.0100	0.100	0.002
Aconite Leaf.....	0.0150	0.0150	0.150	0.00375
Gelsemium.....	0.25	0.375	2.5	0.100
Veratrum	0.05	0.05	0.5	0.015

Feeling that perhaps the standard lethal doses of the drugs referred to in this paper might be more clearly understood if they were stated in a manner similar to that in use in describing the strength of bacterial toxins, that is, by stating the number of units contained in a cubic centimeter of a standard preparation, we suggest the following system, namely, that the unit in this case be the amount required to kill one gram of animal (guinea pig). By this method of calculation we have prepared the following table:

Preparation.	Drug.	Fluidextract.	Tincture.	Extract.
Aconite Root.....	25,000	25,000	2,500	125,000
Aconite Leaf.....	16,000	16,600	1,600	66,600
Apocynum	3,300	3,300	330	
Convallaria.....	3,300	3,300	330	
Digitalis ...	2,500	2,500	250	10,000
Gelsemium.....	1,000	660	100	2,500
		1890. 1900.		
Scilla.....		1000 500	330	
Strophanthus.....	100,000	100,000	10,000	
Veratrum	5,000	5,000	500	16,600

No.	Preparation.	Chem. Assay, Gm. Alkaloid in 100 Cc.	Phys. Assay, Min. Lethal Dose for 250 Gm. Pigs.	Per cent. Alkaloids Calc. from a Lethal Dose of 0.375 Cc. of Fld. Ext.
1.	Tincture.....	0.0316	2.00 Cc.	0.17
2.	"	0.0715	1.25 "	0.23
3.	"	0.0538	2.00 "	0.29
4.	Fld. Ext.....	0.400	0.375 "	0.40
5.	"	0.400	0.375 "	0.40
6.	"	0.400	0.375 "	0.40
7.	"	0.500	0.300 "	0.40
8.	"	0.550	0.3 "	0.44
9.	"	0.465	0.4 "	0.50
10.	Sol. Ext.....	2.185 per cent.	0.09 Gm.	0.52
Average				0.375
Average on Fluid and Solid Extracts alone				0.437

This table serves to demonstrate the necessity for physiologic control of the chemical assay for gelsemium and the worthlessness of the latter unless accompanied and checked by the physiologic test. Just contrary to the results obtained with aconite, the *tinctures* of gelsemium are much more toxic than the fluidextracts, on the basis of equivalent amounts of total alkaloid. This is probably due to a higher proportion of highly active gelseminine being taken up by the percolation which occurs in the preparation of the tincture.

Veratrum.—The chemical results, expressing total alkaloids, in the following tables were obtained by the following method :

The fluidextract, 10 Cc., or the tincture, 100 Cc., is evaporated on purified oak sawdust, and the dried mixture macerated with a mixture of ether 80 Cc., chloroform 20 Cc., and ammonia water 10 per cent. 10 Cc. An aliquot part of the etherial extract is shaken out with 5 per cent. acetic acid, rendered alkaline with ammonia, shaken out with chloroform, evaporated, dried, and weighed.

In the case of the solid extract, two to three grams are dissolved in 50 per cent. alcohol, filtered onto purified oak sawdust and finished like the fluidextract and tincture.

No.	Preparation.	Chem. Assay, Gm. Alkaloid in 100 Cc.	Phys. Assay, Min. Lethal Dose for 250 Gm. Pigs.	Per cent. Alkaloids Calc. from a Lethal Dose of 0.5 Cc. of Tincture.
1.	Tincture.....	0.1	0.5 Cc.	0.100
2.	"	0.102	0.5 "	0.102
3.	"	0.078	0.75 "	0.117
4.	Sol. Ext....	4.0 per cent.	0.015 Gm.	0.120
5.	Fld. Ext.....	1.0	0.05 Cc.	0.100
6.	"	1.145	0.065 "	0.149
Average				0.115

Except for No. 6 in the above table, the lethal dose of which is abnor-

mally high in comparison with the chemical assay, the activity of preparations of veratrum seems to agree quite closely with the percentage of total alkaloids. The chemical assay of veratrum appears therefore to possess undoubted value.

It is the intention of the authors to continue the tabulation of comparative results of physiologic and chemical assay of these drugs, as well as to start similar series of comparisons on conium, physostigma and lobelia.

THE CHAIRMAN: There are several papers along the same line. We will first have them read, and then discussed. The next paper is on "The Variability of Digitalis," by Dr. Worth Hale.

Dr. Hale here read his paper as follows :

THE VARIABILITY OF DIGITALIS.

BY WORTH HALE, M.D., ASSISTANT PHARMACOLOGIST, HYGIENIC LABORATORY,
U. S. P. H. AND M. H. S.

So much has been written concerning the variability of digitalis that it would seem unnecessary to write further upon the subject. However, additional facts develop from time to time so that many of the points at issue are by no means definitely settled.

The purpose of this short paper is to point out certain experimental evidences, part of which support and part of which oppose certain factors which, because of much repetition in the literature, have seemed to be definitely established, and to propose a remedy by which most of them may be ignored.

Since whatever conclusions to be drawn from a series of experiments depend for their value upon the accuracy of the method used, the method of experimental procedure will be briefly described. As an assay method for digitalis and other allied drugs the chemical method does not seem to be as accurate or reliable as biological methods. The method provisionally adopted at this laboratory was chosen because it appeared to offer certain advantages over others in common use and moreover to be simple and easily carried out.

Healthy frogs of the same species are injected with the preparation under consideration. The animal is kept at a constant temperature of 22° to 23° C. for one hour, at the end of which time the brain and cord is destroyed and the thorax opened to note the condition of the heart. As an end reaction the ventricle must have just stopped in permanent systole.

To test the accuracy of the method eighteen unknowns, consisting of weighed amounts of the so-called pure principles of digitalis, strophanthus, and convallaria dissolved in 25 per cent. alcohol were assayed. Upon comparison of the values obtained by the use of frogs with the record of the amounts by weight it was found that the error varied from zero to 10

per cent., but on the average 3.9 per cent. for the whole series. The great value of a method as accurate as this is made plain when it is remembered that digitalis as obtained on the open market has been thus shown to vary as much as 400 per cent. in activity.

Having thus established the approximate accuracy of the method for quantitative work, a number of the commonly cited causes of the variability in digitalis and its preparations were taken up.

It has been repeatedly stated that only second-year digitalis leaves should be used, and in recognition of this the Pharmacopœia prescribes leaves of the second year's growth. Focke, a German investigator, reported, however, when compared with digitalis leaves of the second year gathered at the time of seeding that first-year leaves were about 20 per cent. more active, although at time of flowering the order was reversed. Hart in England reported the assay of one sample of first-year leaves, which gave a value also about 20 per cent. higher than second-year leaves, but which were gathered at the time of flowering.

My own experience is with three lots of first-year leaves, all of which were garden-grown. One was grown at Madison, Wisconsin in 1908, and two in the Government drug garden at Arlington, Virginia, one of the 1907 crop, the other of the 1909. The leaves were powdered to number 60 powder and then made up into tinctures according to the U. S. P. VIII. The results of their assay were as follows in terms of heart units per Cc. (By heart unit is meant the amount of the preparation per gram weight of frog to produce the end reaction). Arlington, 1907, 200 heart units; Arlington, 1909, 200 heart units; Wisconsin, 1908, 182 heart units. A tincture made up from Allen's English leaves at the same time and in as nearly the same manner as possible contained 133 heart units per Cc., or in terms of per cent. the first-year leaves were 50, 50 and 37 per cent. stronger than select English leaves of the second year's growth. As a further proof of the high activity of these lots of first year leaves it is of interest to note that in all my experience with assay work only one other tincture, presumably made from second-year leaves showed as high values as these.

In connection with these assays a further interesting fact is to be noted, namely that this high value was given by leaves grown in gardens. The often repeated statement that wild growing plants furnish leaves of the higher potency probably is true in many instances but it seems doubtful that this fact alone has much to do with high activity and that to specify either second-year plants or leaves from wild growing plants in the pharmacopœia will decrease the variability factor or increase the potency of the preparations made from them.

A point often made, and which would seem to have considerable importance in securing digitalis leaves of a high value, relates to the manner of drying. Hamilton as early as 1807 warned physicians against the use of

improperly dried leaves and since then many similar reports based either on clinical or experimental knowledge have been made. Focke especially lays much stress on this point not only as a means of securing preparations of high activity, but what is equally important, of delaying their deterioration with age. As a result of his work he recommends that the leaves should be so dried as to contain not more than 1.5 per cent. moisture and to maintain this condition that they should be stored in air-tight glass containers.

My own experience regarding this point is by no means extensive nor is it absolute. However a number of facts have developed to show that leaves as ordinarily dried and containing approximately 5 to 8 per cent. of moisture may maintain a high potency for some time. Thus an assay of digitalis leaves at least 8 years old and entirely open to the influence of atmospheric conditions had as marked activity as fresh English leaves; 1907 first year leaves examined in 1910 were as active as first year leaves of the 1909 crop. Both were only ordinarily dried and were stored in cloth bags in a climate that is very humid. Nevertheless and possibly further attesting the potency of first year leaves, these were of exceptionally high activity. 1908 English leaves, containing 7.8 per cent. moisture were examined 1909 and again a year later showing the same activity in each case. Thus there does not seem to be necessarily any marked deterioration because of ordinary amounts of moisture. But if sufficient moisture be added as in one instance to cause moulding, the decrease in activity in nine months was about 90 per cent. In conclusion therefore it seems probable that while careful and prompt drying is of some importance it is not at all essential to reduce the moisture content to 1.5 per cent.

In this connection the use of heat as an aid to the drying process is of importance. Several small lots of powdered digitalis were submitted to temperatures ranging from 80° to 140° C. for two hours. These were then made up into official tinctures and assayed. Up to 120° C. no deterioration was evident; at 140° C., however, the preparation was approximately 60 per cent. weaker than the normal, containing only 71 as compared with 125 heart units per Cc., the value of the normal, as the average of the series of experiments.

Preparations of Digitalis.—The finished digitalis product has been shown to vary equally in strength with the crude drug—that is, about 400 per cent.—Several reasons are offered in explanation of this fact although by far the most important is the variation in the crude drug itself. However, from my limited experience I wish to emphasize the point advanced by Vanderkleed and Bernegau in 1908, namely, that to use an assayed crude drug does not necessarily insure a uniform finished product. On that account the record of the assays of the crude drug in the first part of this paper are to be regarded as only relatively absolute although the

preparations, the tinctures, were prepared in as nearly as possible the same way at the same time to make more certain equable conditions. Thus tinctures prepared from the same leaves gave values in the inverse ratio of 8, 7 and 12 * ; another series, 7 and 9.

Differences in percolation are responsible undoubtedly for the fact that the fluidextracts of digitalis assay not 10 times but on the average only 5 times stronger than the tincture. Fluidextracts and tinctures made from the same leaves in several series of percolations gave values in the ratio of approximately 1 to 3 and not as might be expected a ratio of 1 to 10.

In this connection and based partly on this evidence I wish again to enter a protest against the fluidextract of digitalis. So far as I can determine it is used only in preparing solutions said to represent the official tincture or what is more absurd the official infusion but which most certainly do not correspond to them either in strength or necessarily in character.

Although differences in manipulation may cause considerable variation in the finished product the further factor of subsequent deterioration is also to be considered. This was emphasized by Dr. Houghton in a paper before the Association a year ago. My own experience though less extensive is largely confirmatory. I have found however that while certain preparations deteriorate with age others do not seem to do so, at least not so rapidly. Thus two official fluidextracts examined in 1908 and again in 1909 showed the same activity. On the other hand three preparations made up according to special formulas showed a decrease in activity ; one of 25 per cent., one 60 per cent., and one more than 100 per cent. A fourth preparation made according to a special formula examined in 1908 only was entirely devoid of a digitalis action. But it is not urged, in spite of this evidence, that digitalis preparations made up according to special formulas invariably deteriorate more rapidly than the official preparations. It only makes the use of such preparations questionable until thorough tests of their keeping qualities under the ordinary conditions found in pharmacies have been made.

Further evidence of slight deterioration in certain preparations is afforded by the results of assays of three tinctures made at the German Hospital, Philadelphia. One of these was made from English leaves according to the U. S. P. in 1908, the other two in 1902, one from English and one from German leaves. All showed about the average potency of digitalis tinctures, the 1908 sample made up with 50 per cent. alcohol as the menstruum assaying 143 heart units per Cc., the 1902 preparation made from English leaves according to the International standard with 70 per cent. alcohol as menstruum also assaying 143 heart units per Cc., the

* No reason for the low assay value can be given but it was undoubtedly due to faulty percolation.

third made from the German leaves according to the International standard with 70 per cent. alcohol assaying 117 heart units per Cc.

These results show therefore either a very high original potency for the preparations made according to the International standard or what seems more likely deteriorated very little during the years since their preparation in 1902 owing to the higher percentage of alcohol used.

CONCLUSIONS.

1. First year leaves are not necessarily weaker than second year leaves and might be used in preparing assayed digitalis preparations.

2. There is not necessarily any difference in the activity of wild and garden grown leaves.

3. Excessive drying is not essential in preventing deterioration of leaves although prompt and thorough drying to less than 10 per cent. moisture or perhaps even somewhat more completely is essential.

4. The assay of the crude drug does not necessarily insure a uniform finished product.

6. Great variability in the keeping qualities of preparations is to be noted, but the deterioration from age seems to be very slight if 70 per cent. alcohol is used.

As a remedy for all the variations in digitalis the physiological assay of all official preparations to a definite strength and by a definite official method is proposed. The method to be adopted might be one of several, but on account of its simplicity and accuracy essentially the same method used by *Famulener and Lyons** is offered for general adoption. *This with certain modifications*, may be as follows:

1. The animals used should be frogs (*Rana pipiens*), weighing between 15 and 35 grams to be kept until used in storage tanks at a temperature of 10° to 15° Centigrade.

2. When used they should be brought to the operating room, injected through the mouth into the abdominal lymph sac with definite amounts of the drug per gram of body weight and placed in jars or cages kept at a temperature of 22° to 23° C.

3. At the end of one hour the frog should be pithed, the thorax opened and the condition of the heart noted.

4. As an end reaction the ventricle should have just come to a permanent systole, a reaction which is easily determined by injecting a series of frogs with such doses that the heart will be beating in part and in permanent systole in others. A unit is proposed to show variations in activity in *direct* ratio to the strength of the preparation; the unit to be that amount of drug in Cc. per gram of body weight to bring on the end result and the results tabulated in units per one Cc. of the preparation.

* *Famulener and Lyons*.—*Proc. Am. Pharm. Ass.*, 1902, 50.

THE CHAIRMAN: The next paper is entitled "The Biological Standardization of Drugs," by R. A. Hatcher and J. G. Brody.

This paper was read by Dr. Hatcher, who accompanied his remarks by blackboard illustration.

THE BIOLOGICAL STANDARDIZATION OF DRUGS.

BY ROBERT A. HATCHER AND J. G. BRODY.

This comprehensive title was chosen by one of us some months ago with the intention of presenting brief outlines of a number of methods of biological standardization which retail pharmacists would find available.

Since then we have been devoting most of the time at our disposal for the purpose to the study of one group of drugs, and we shall therefore limit the scope of the paper to a single method, and a consideration of some of the drugs for which the method is adapted.

Crawford (*Am. J. Pharm.*, vol. 80, 1908, p. 321) has given an excellent review of a number of the more important methods of biological assay. He says: "The group of digitalis, strophanthus, and squill is the most important one which we as physicians have to use, and it earnestly demands standardizing." He quotes Naunyn as saying that he would not care to be a physician without digitalis. He also quotes Dixon as saying: "For my part I unhesitatingly express the belief that many hundreds of patients die annually from digitalis and allies not possessing the virtues required of them." To the foregoing we would add that we are equally convinced that the want of precise methods of dosage is responsible for many cases of poisoning with digitalis, and it is with this group of drugs that we have been engaged for the most part.

We are aware that many will raise the objection that the details of biological assays are of little more than theoretical importance to the retail pharmacist because he is unable to conduct these operations. We believe that the progressive pharmacist must be prepared to make the simple biological tests at least, if he is to pretend to keep pace with the progress of his profession, and it is our purpose to outline the technic of our method, which is so simple that it may be mastered by the retail pharmacist, and conducted with the apparatus which he has at hand.

H. C. Wood, Jr., has recently sought to convey the impression that it is hopeless to expect any degree of precision by means of the test on animals even when it is conducted by the trained pharmacologist. Wood says: "And first I shall speak of its limitations. We sometimes read of the physiological test being used as a control of the chemical assay. To attempt to corroborate the findings of the chemist by a test on the living animal is about as sensible as it would be for a navigator to regulate his chronometer by an Ingersoll watch; the relative accuracy of the chemical and physiological assay is about the same as that of the \$200 chronometer and the dollar watch."

To this statement we wish to enter certain exceptions.

Method.—The method of standardization which we have chosen for the digitalis group and some other drugs consists in determining the minimal fatal dose per Kg. of cat when the drug is injected slowly into the femoral vein, the standard chosen for the digitalis group being the cat unit.

The cat unit may be defined most accurately perhaps, as the amount of crystalline ouabain* which is fatal within about ninety minutes to a kilogramme of cat when the drug is injected slowly and almost continuously into the femoral vein. A cat unit is equal to almost precisely 0.1 Mg. of crystalline ouabain, or one ten-millionth of the weight of the animal.

We would prefer this definition of the cat unit rather than that which would embrace any digitalis body required to produce a similar effect within the same period of time when used in this way. The reasons for this will be apparent from the discussion of the method.

When crystalline ouabain, amorphous strophanthin, or a preparation of strophanthus is to be tested, it is only necessary to inject the solution from a syringe or burette into the femoral vein until the animal begins to show toxic symptoms. The injection is then interrupted, or continued more slowly until the unmistakable signs of approaching death are seen. These signs are so typical that one is rarely mistaken concerning them. They consist in irregularity of the heart, difficult respiration, convulsions, and frequently a peculiar cry, after which recovery is extremely rare. If death does not occur in a few minutes the injection is continued with extreme caution.

Other members of the digitalis group may be tested in the same way, but the results will be somewhat too high as a rule, and in that case the necessary correction, usually amounting to about 20 per cent., may be made, or the assay may be made more accurately by a modification of the technic. Somewhat more uniform results are obtained if about 75 per cent. of the total amount of the digitalis body is injected in the first fifteen minutes and the remainder in the following hour. These results will still be too high, and we have therefore devised a modification of the method of estimating some of the other digitalis bodies which gives results which we believe to be nearly as accurate as those obtained with crystalline ouabain itself.

It might be better to explain the reason for this modification first, but for convenience the discussion will be given later.

Just as the analytical chemist may find it desirable to determine the alkalinity of a liquid by adding an excess of acid and titrating back with an alkali, so we have been able to obtain more accurate results in some cases when we inject a measured amount of the digitalis body (tincture or infusion of digitalls, or digitoxin) in the first period of about ten minutes,

* The older term ouabain is to be preferred to that of crystalline strophanthin, which has lead to much confusion.

and after an interval of twenty minutes continue the injection, substituting a solution of crystalline ouabain for that of the digitalis body under examination until the death of the animal, or until the toxic symptoms appear. Naturally, we assured ourselves that ouabain was capable of replacing the other digitalis bodies before we adopted this method.

The difference between the amount of crystalline ouabain actually used to complete the assay and 0.1 Mg. per Kg. of animal (the amount which would have been required in the absence of the digitalis body), represents the activity of the digitalis used.

The following example will illustrate the mode of computing the activity of the digitalis body tested: A tincture representing 70 mgs. of digitalis per kg. of cat was injected into the femoral vein and after twenty minutes the injection of a solution of ouabain was begun. The animal died with the typical symptoms of digitalis poisoning when 0.00142 mg. of the crystalline ouabain per kg. had been injected. The difference between 0.0142 mg. and 0.1 mg. (which would have been required had the ouabain been used alone) is 0.0858 mg. or 85.8 per cent. of a cat unit, hence 70 mgs. of digitalis equals one cat unit. A duplicate experiment gave 18.8 mgs. of the digitalis. That the results obtained by the modified technic are more accurate than those with the continuous injection of the digitalis alone is shown by a comparison of the results of the following experiments intended to fix the minimal lethal dose of digitalis by the vein with those given in Table III.

- 2 /24/'10. Male cat, Wt. 3.65 kgs. ,
10.30 A. M. Injected 0.085 Gm. digitalis per kg. by vein at once.
10.45 A. M. Emesis. Cat lived over 7 hours, but died during the night.
- 4 /9/'10. Female cat, Wt. 2.02 kgs.
11.40 A. M. Injected 0.080 Gm. per kg. by vein at once.
12.02 A. M. Emesis. (Repeated emesis.)
- 4/11/'10. Cat weighs 1.68 kgs., having lost 0.34 kg. in weight.
9.42 A. M. Injected 0.075 Gm. digitalis per kg. by vein at once.
9.58 A. M. Death occurred. (Cumulation.)

We have tested the following substances by intravenous injection into the cat: Crystalline ouabain, amorphous strophanthin, strophanthus seed, tincture of strophanthus, digitalis, tincture of digitalis, infusion of digitalis, digitoxin, digitalinum verum, digitalein, adonidin, digalen, amorphous digitoxin so-called, digipuratum, all belonging to the digitalis group, and German digitalin which does act like digitalis when injected in this way, since it consists largely of digitonin which causes a sharp fall in the blood pressure when injected into the vein. We examined digitonin and spar-teine also, neither of them giving the digitalis action. Strychnine gave fairly uniform results, but the method requires careful control. Nicotine,

physostigmine, and aconitine did not give concordant results in the experiments we made, and we have not been able to determine whether it is possible to modify the technic so as to make it available for those bodies or not.

TABLE I.

Equivalent in Mgs. per cat unit of various digitalis bodies.

Ouabain, cryst	0.10
Stroph. amorph. B. and S.	0.13*
Stroph. amorph. Merck.....	0.17
Digitoxin, cryst	0.30
Digitoxin, am. so-called	1.20
Digitalinum ver. Kil.....	1.50
Stroph. hisp.....	1.50
Digitalein	2.90
Adonidin	3.00
Stroph. Kombé.....	3.00
Digitalin, German	4.00
Digitalis, German	82.00
Digitalis, Eng.....	92.00

The estimations in the table were made by the continuous injection of the various bodies mentioned except in the case of digitoxin and the digitalis leaf, and it is quite possible that corrections will have to be made for some of these when crystalline ouabain is used to complete the injection. Attention is called to the similarity of the results reported to those obtained by Worth Hale in comparing crystalline digitoxin with the amorphous so-called, (*J. Am. Med. Assn.*, v. 54, p. 35), but we believe that the method reported here has the advantage of greater accuracy and ease with which it may be followed, and of great economy in time.

TABLE II.

Mgs. Digitalis per cat unit.	Mgs. Digitalis + Ouabain.
A. 75.2.....	47 + 0.0351
A. 73.5.....	49 + 0.0333
B. 81.8	35 + 0.0572
C. 81.6	70 + 0.0142
D. 92.3	60 + 0.0350
D. 102.6	60 + 0.0414
E. 96.1	80 + 0.0168

The figures in the first column show the number of milligrammes of digitalis computed to equal 1 cat unit; those in the second and third columns indicate the digitalis and ouabain actually used.

* This amorphous strophanthin of Boehringer and Sons sold in sterile tubes apparently is more active than other specimens of their amorphous strophanthin or that of Merck which we have examined at different times.

TABLE III.

	Mgs. Digitalis per cat unit.
A. Ger. (old) tr	96.6
A.	91.0
A.	97.0
A.	122.0
B. Ger. (new) tr.....	96.0
B. Ger. (new) tr.	98.7
C. Ger. (new) inf.....	99.6
C. ¹ Ger. (new) inf.....	98.0
C. Ger. (new) inf	103.0
D. ² Eng. (new) tr.....	113.7
D. ² Eng. (new) tr.....	113.7
D. Eng. (new) inf.....	115.0
D. Eng. (new) inf.....	122.0
D. Eng. (new) inf.....	110.0
D. Eng. (new) inf.....	106.0

The values in Table III were obtained by the injection of digitalis alone (cf. Table II) A. represents a tincture obtained from leaf ground for percolation by Gilpin, Langdon & Co., in Oct., 1906. B. was from a specimen obtained from the same firm in April, 1910, and was said to have been obtained as recently as possible. D. was from an English leaf obtained at the same time as the German just mentioned. It was said to be from a carefully collected and treated cultivated leaf.

C.¹ had had 100 Mgs. of the same per rectum 3 hours previously.

D.² were labeled Mixt. A. and B., and the strength of these were unknown to the operator, Dr. Brody. In the first of these two experiments 2.73 Cc. per kg. were used, the cat weighed 1.65 kgs., hence 4.5 Cc. were injected; in the second 3.18 Cc. per kg. were used for a cat weighing 2.22 kg., a total of 7.05 Cc. The first solution represents 125 Mg. in 3 Cc., and 3.5 Cc. of the second represents a like amount.

Four estimations of digitalinum verum were made. 1.50; 1.52; 1.56, and 1.80 Mgs. respectively were found to be equal to 1 cat unit.

Digitalinum verum and digitoxin being insoluble in water, alcoholic solutions were employed.

Four estimations of digitalein were also made, the equivalents of a cat unit being 2.89; 2.90; 2.98, and 4.50 Mgs. respectively. Digitalein being very soluble in water, is used conveniently in this way.

Two lactating animals were given large amounts of strophanthus in one case, and digitalis in the other. The first took 217 Mgs. of digitalis per kg. of weight, which is more than twice the amount of this specimen usually required and the second took two and one-third times as much strophanthus as other cats of the same weight. These are the only two instances in which an animal required anything like so much of these two drugs. We are unable to state whether this is a coincidence or whether

lactating animals are habitually tolerant toward the drugs of this group. We hope to be able to decide this point in the near future.

Three experiments were made with impure adonidin. The first animal received more than 6 Mgs. of the drug per Kg. of weight. We had little idea of the activity of the specimen and injected it much more rapidly than in the second and third experiments, hence the excess over that actually required was much greater. This experiment should be disregarded in the calculations. The second and third animals received 2.86 and 3.12 Mgs. per Kg. respectively.

The results obtained with German digitalin require an explanation. German digitalin is wholly unsuited for estimation by intravenous injection, its true digitalis action being much less than that indicated by the figures in the table, death being due mainly to the digitonin of which it is chiefly composed. German digitalin probably has no place in digitalis therapy.

When the official preparations of digitalis, such as the tincture, are diluted with water, a precipitate occurs, indicated by a faint opalescence, and in our earlier experiments we were unable to get uniform results when these diluted liquids were injected over a period of an hour or more. The injection of a large amount of alcohol is not permissible, and the use of concentrated preparations precludes the same degree of accuracy that is possible with the more dilute liquids. These objections are overcome, in part, by the combined method, in which ouabain is used to complete the estimation.

We have never seen any embarrassment of the respiration beyond some increase in the rate until the heart stopped. The immediate signs of asphyxia with excessive efforts at respiration showed that the respiratory center was still intact. Furthermore, those drugs which kill by paralysis of the respiratory center, usually give very variable results when used in this way. Strychnine is an exception, but there are many factors involved in the rapid action of strychnine, and it is quite possible that the sudden death following the intravenous injection is not due to its direct effects on the respiratory center alone. The fact that the heart stops after all of the digitalis bodies before the respiration is seriously impaired is the strongest answer we can make to the contention of Edmunds and Hale (Hygienic Laboratory, Bulletin No. 48, 1908), that methods which employ as a standard the minimum lethal dose for the higher animals are not applicable to the physiological assay of the digitalis series.

It is hardly necessary to state that it is a matter of vital importance that a standard shall be found for all the digitalis bodies in which the relative activity of the different members on the human heart may be expressed.

Hale found between 7 and 8 Mgs. of digitoxin per Kg. of frog, and 600 Mgs. of digipuratum per Kg. (*J. Am. Med. Assn.*, v. 54, p. 129) necessary to cause systolic standstill in an hour. This is sixteen times the amount of digitoxin, and eight times the amount of digipuratum, required

per kilo for the cat's heart in our experiments. On the other hand, we have found that less than twice as much strophanthus is required per kilo of frog as for the cat.

The following figures expressed in milligrammes per Kg. of frog were obtained by Famulener and Lyons (Proc. Am. Ph. Assn., 1902, p. 415). Digitalis leaf, 675; digitoxin, 8.7; strophanthus (5 per cent. tincture), 5.625; strophanthin, 0.5 (c. f. Table I); adonidin 4. They state in their conclusions: Determinations of the relative strengths of different samples of the same drug may be made with precision sufficient for practical purposes by physiological experiments on animals, but, as might be expected, the relative medicinal strength of different drugs cannot be correctly inferred from the observation of a single symptom produced in an animal like the frog. They found differences of less than ten per cent. in duplicate experiments.

A further disadvantage in the use of the frog is due to the differences in the rate of absorption of the different digitalis bodies. Even such closely related bodies as amorphous and crystalline strophanthin differing markedly in this respect. Famulener and Lyons have also called attention to this objection.

We have attempted to compare the results which those authors obtained when working with the frog with those obtained by ourselves with the cat but the differences are evidently due to differences in the animals and not to the limits of error.

Focke (Pharm. Zeitung, vol. 54, No. 68, says that after further consideration of the subject he believes that it is not feasible to accustom physicians to thinking and calculating the strength of digitalis preparations in frog units.

There are many reasons for believing that the action of the digitalis bodies on the cat's heart is a better index than that on the frog's of their effect on the human heart. Man absorbs strophanthin much as the cat and dog do, and the effects are much the same. Koppe's experiment in which 2 Mgs. of digitoxin taken in dilute alcohol caused serious symptoms, shows the possibility of rapid absorption and unusual action; on the other hand, we know of instances in which 2 Mgs. of crystalline ouabain have been administered intravenously without causing ill effects, though that is 25 per cent. of the theoretically fatal dose.

The cat is the least resistant to strophanthin and ouabain of all the animals which we have examined, but the rat and mouse alone, so far as our experience goes, are very resistant. There are marked differences in the subcutaneous and intravenous doses for the rabbit and some other animals, but not for the cat and the dog.

The various digitalis bodies are the subject of clinical investigation at the present time in certain of the hospitals in New York, with the object of comparing their quantitative therapeutic action in connection with the

results on the cat's heart, as shown by the experiments which we are conducting.

Naturally, minimal doses are being employed, but the comparative activity of crystalline ouabain and strophanthin even in the doses which have been recommended, seem to explain why positively brilliant results have followed occasionally the intravenous use of these substances.

We believe that the cat unit offers an easy means of computing the therapeutic dose of the various digitalis bodies when these are to be administered intramuscularly or by vein, but the rate of absorption from the alimentary canal must be determined before the oral use of these can furnish us reliable results.

That cumulation does occur with certain of these substances must be admitted, or, what amounts to nearly the same thing, the drug is not excreted or destroyed so readily in some cases as in others.

Strophanthin and ouabain may be repeated more frequently than digitalis, our incomplete investigations leading us to believe that the action of digitalis is far more persistent than is generally supposed.

We believe the outlook is more encouraging now than it has been at any time in the past for putting the therapeutics of digitalis upon a rational basis, but it must be admitted that we have no means at present of securing any degree of uniformity of action after the oral administration of these bodies, though it is not hopeless to look for one which will be absorbed readily from the alimentary canal, and we are endeavoring to find such a member of the group.

DISCUSSION.

The Choice of the Animal.—There are several reasons which influenced us to use the cat. These are in the order of their importance: Accuracy afforded, facility with which they may be obtained, ease with which they may be handled (contrary to common opinion), cheapness, and the fact that their use does not effect the sensibilities of the sentimental portion of the community to the same extent that the employment of the dog does.

The Use of Ouabain to Complete the Reaction after Digitalis.—It is commonly stated that digitalis acts slowly, thus Sollman, Text-book of Pharmacology, 2nd ed., p. 488, says: "The action of the digitalis group is peculiar, in that it cannot be secured at once, unless toxic doses are given intravenously. If this is done, the animal goes through all the stages; but even in this case, several hours are required until death occurs, no matter how much of the drug is given."

The latter part of this statement does not apply to the cat, nor does it apply to strophanthin so far as I am aware; nevertheless, it is true that moderate * doses of digitalis act much more slowly on the cat's heart than

* Massive doses of digitalis may cause death in 60 seconds, or about half the time re-

crystalline ouabain does, hence the interval that occurs between the injection of the minimal fatal dose and the death of the animal is longer with digitalis than it is with ouabain, and a greater excess of the digitalis will be injected during that interval. If approximately fifty per cent. of the fatal dose of digitalis is injected into the vein and twenty minutes are allowed to elapse and the injection is then continued using one part of crystalline ouabain in one hundred thousand parts of physiological salt solution, the end reaction is almost as sharp as with ouabain alone, the interval appearing to suffice for the digitalis to exert almost its full action on the heart.

The extraordinary uniformity * of the action obtainable with ouabain and other digitalis bodies on the cat's heart calls for some comment. We have been inclined to think that this might be explained by the absence of racial peculiarities, due to the nocturnal habits of the cat whereby cross breeding is almost universal. We are endeavoring to explain this uniformity, and while we believe there is a deeper significance than the one just suggested, we are not prepared to go deeply into a discussion of this phase of the question at present.

The fact that crystalline ouabain is capable of replacing amorphous strophanthin, as well as the digitalis bodies found in the leaf, as far as the direct action on the heart is concerned, lends support to the suggestion made by Schmiedeberg many years ago that all the members of the digitalis group depend on a similar nucleus for their action.

The use of this method of biological assaying and its remarkable accuracy have led us into the investigation of some problems which we wish to mention at this time, though they have no immediate connection with the subject of the paper. We are employing it to show the degree of absorption which occurs after the oral administration of the various members of this group. The results show that absorption is exceedingly irregular with all of them which we have tested. By this means we have also found that the tincture of digitalis represents the activity of the leaf fully, the marc left after the preparation of the tincture from a specimen of the German digitalis in one case, and from the English in another, being inert. The same may be said of the infusion, at least a 1 per-cent. infusion

quired by the largest doses of crystalline ouabain. We believe that this extraordinary rapidity of action of digitalis is attributable largely to digitalein, which also acts rapidly.

* Since writing the preceding statement, which was based on a very large number of experiments covering a period of several years, we have found a number of cats which tolerated doses up till nearly fifty per cent. more than that stated. We are unable as yet to explain this. As previously stated, the only ones which succumb to doses below the standard are the excessively fat. The later observations do not prevent the use of this method of standardization, but a somewhat larger number of observations are necessary than would be otherwise.

showed the same activity as the tincture diluted to the same strength, and, as just stated, this fully represented the leaf. We have also found in one case that a carefully prepared tincture of strophanthus, made according to the pharmacopœial process, represented only about two-thirds of the total activity of the seed, despite the fact that percolation had been continued for one week. The greater part of the strophanthin which is extracted is removed during the first part of the percolation, a part of the strophanthin, or some related body, being removed slowly by percolation. The total active principles of the seed may be removed completely, so far as we have been able to determine, by infusing the finely powdered seed for one hour on a boiling water-bath.*

The foregoing suggests a number of ways in which the biologic test may be utilized by the retail pharmacist.

Several interesting points are raised by the results with strophanthus recorded in Table I. A specimen of *Strophanthus hispidus* was examined and the tincture and the infusion gave concordant results indicating that 3.5 Mgs. equaled 1 cat unit. A specimen of the Kombé showed exactly half the activity of the hispidus, 7 Mgs. being found to be equal to a cat unit, a tincture and an infusion being likewise examined. Subsequently an authentic specimen of each, obtained from Professor Rusby, was examined, the seed being finely powdered and exhausted by heating on a boiling water-bath for an hour. The ratio of activity of the infusions was the same as that just mentioned, but both infusions were much stronger than we had anticipated they would be, and 1.5 Mg. of the hispidus and 3 Mgs. of the Kombé were found to be equal to a cat unit. The activity of this specimen of hispidus corresponds to about 12 per cent. of Merck's amorphous strophanthin—an activity that has been hitherto unsuspected, we believe.

Conclusions.—The cat affords a simple method of standardizing the drugs of the digitalis group. The method is available for the retail pharmacist who will devote as much care to the process as is required in the chemical assay of opium.

The cat affords a means of comparing the activity of the several digitalis bodies on the human heart. This is not possible on the frog by present methods.

With some of the digitalis bodies, notably digitoxin, the minimal lethal

* Since this paper was read at Richmond we have tested a tincture of strophanthus made by the pharmacopœial process and found that it did not represent the seed fully, but the marc yielded no active principle to boiling water. Another tincture prepared from the same specimen of seed after removing the fixed oil did represent the seed fully, 1 Cc. being equal to more than 60 cat units. This suggests that the active principle may undergo some change even during percolation or infusion.

It will be remembered that there is no difficulty in exhausting digitalis either by percolation or infusing the powdered leaf.

dose for the cat by the vein is determined more conveniently by injecting about one-half of the lethal dose into the vein, and after an interval of about twenty minutes, injecting crystalline ouabain (so-called crystalline strophanthin) until the animal dies.

Crystalline ouabain is capable of replacing any of the digitalis bodies which we have tested so far as the direct action on the heart is concerned, that is, one-half of the fatal dose of any of these digitalis bodies and one-half of the fatal dose of crystalline ouabain will cause death in a short time if they be injected into the femoral vein in the manner described.

The absorption of digitalis and of strophanthus from the alimentary canal is extremely variable; that of strophanthus is far more variable than that of digitalis; for this reason the activity of these drugs cannot be fixed by means of the oral administration.

Cumulation occurs with digitalis to such a degree that no conclusions can be drawn regarding activity from the effects on animals which have been used previously for digitalis, unless many weeks have elapsed since the previous use.

Cornell University Medical College.

THE CHAIRMAN: Now, gentlemen, we have before us a report of the Committee of the Scientific Section of the Philadelphia Branch of the American Pharmaceutical Association. This committee on physiologic assay, has compiled a comprehensive report and it is before you. I will ask Dr. Wood to present it to you.

DR. WOOD: Gentlemen, I wish to say preliminary to this report, that this committee was appointed this spring, and we have not had as much time as we would have liked, to investigate some of the points which come up in this connection. This report represents the work of Dr. Gihens, Dr. Hofer, Dr. Scott and myself.

Dr. Wood then read the report as follows:

REPORT OF COMMITTEE ON PHYSIOLOGICAL ASSAY.

The Committee on Physiological Assay of the Philadelphia branch of the A. Ph. A. has considered the advisability of introducing into the Pharmacopœia physiological tests for the following drugs:—apocynum, convallaria, digitalis, squill, strophanthus, aconite, gelsemium, lobelia, veratrum, cannabis, ergot, pepsin, suprarenals, thyroid, chenopodium, granatum, kousso, santonica, cimicifuga, gossypii cortex and phytolacca.

Cimicifuga, gossypii cortex and phytolacca seem of too little importance to acquire physiological standardization.

The vermifuges, chenopodium, granatum, kousso and santonica, might, we believe, readily be standardized according to the method which was employed by Brunning (Zeit. Exper. Pharm. u. Therap., 1905–L–80) in connection with the oil of chenopodium. He determined the vermifugal effect upon the intestinal worms obtained from the alimentary tracts of dogs and cats. Inasmuch, however, as we are unaware of any application of this method for the process of standardization and as time was insufficient for experimental work on the part of the Committee, we do not feel inclined to recommend the introduction of physiological tests in connection with these drugs, although we would call the attention of the Committee on Revision of the Pharmacopœia to the possibility of such standardization.

Cannabis.—Two standards have been suggested for *cannabis indica*. That which is most frequently employed is the amount which is required to produce muscular inco-ordination in the dog. The other is the amount required to produce narcosis in the frog. As regards the second of these tests, the fact that *cannabis indica* is practically insoluble in water and that frogs are very susceptible to the action of alcohol seems to us to preclude its use. In regard to the first test, it has been the universal experience that there is a large variation in individual susceptibility in different dogs, so that to obtain results which are even approximately accurate, it is necessary to use the same dog repeatedly. The prolonged use of the drug, however, appears to beget a certain amount of immunity toward it so that one dog can be used for only a comparatively small number of tests. Even with the utmost precautions, the results are far from accurate. As it is impossible on account of individual idiosyncrasies and the uncertainty of the end reaction, to definitely assign any dose and as the results are so inaccurate, we feel that until some more satisfactory means of standardizing *cannabis indica* has been suggested, no physiological assay process should be introduced into the Pharmacopœia.

Ergot.—Another drug which urgently requires some method of standardization is ergot. The cock's comb test, as has been shown by Edmunds and in our own experiments, is unreliable. Two other methods have been suggested for this purpose, one based upon the activity of the drug upon uterine muscle and the other based upon its effects upon the circulation. Each of these methods requires either that the sample be compared to a standard preparation or else that a considerable series of animals be employed for each test and the average taken of the series. Against the method of comparing the effects with a standard preparation, rises the almost insuperable obstacle of keeping a standard preparation on hand without deterioration. Our opposition, expressed in connection with digitalis, to any method of test for any drug which requires comparison with a standard preparation unless the standard preparation can be made by any competent pharmaceutical chemist, applies still more strongly to ergot. The method of taking the average of a series makes the assay so expensive and so tedious as to practically preclude its use by any but the largest, wholesale manufacturers. Moreover, there is at least a reason to hope that before the next edition of the Pharmacopœia appears, a satisfactory chemical test for this drug will have been devised. For these reasons we do not recommend the introduction of a physiological standard for ergot.

Thyroid.—Thyroid gland does not in our opinion require physiological standardization as the work of Hunt has shown that the percentage of combined iodine is an accurate indicator of the quality of the drug and we believe that where a chemical test is equally available it should be given the preference to a physiological one.

Veratrum.—The one physiological test for *veratrum* which as far as our reading goes, has been suggested, is the quantity required to kill. As this substance contains a number of alkaloids which are quite different in their effect, we do not believe that such a test is of any great practical importance. Moreover, as the active principle of this drug is alkaloidal in nature, it would appear to us that a method of chemical standardization could be devised. We would call attention to the fact, however, that the total percentage of alkaloid is no indication of physiological power of the drug, for as has been shown by Eden (Archiv. f. Exper. Path. u. Pharm. xxix, page 40) the protoveratrine which constitutes a comparatively small percentage of the alkaloidal content of the plant is so much more powerful than any other principle that it practically dominates the action of the drug.

Aconite.—Although the Pharmacopœia directs that aconite should contain 0.5 of 1 per cent of aconitine, yet the method described gives rather the total alkaloid of the drug. The percentage of total alkaloid is by no means an accurate criterion of the activity of the specimen since there are present in the crude drug at least two other alkaloids besides aconitine, which are greatly inferior in potency; therefore the drug might

assay comparatively high in alkaloid but be of feeble physiological power. We would recommend, therefore, the introduction of a physiological standard for this remedy. E. R. Squibb suggested a method of physiological standardization based on the power of aconite to cause tingling of the lips. A definite amount of the drug is rubbed up with 1 Cc. of water and held in the mouth for one minute. This should cause a tingling of the lips, coming on in about twenty minutes and lasting an hour. This test is unreliable both because of the difference in susceptibility of different persons and because of the great variations in the susceptibility of the same individual on different days. The standard which we would suggest is based upon the amount required to kill a given weight of animal within a period of twenty-four hours. The fact that guinea pigs may be readily obtained and are so easily handled makes them the most available animals for this purpose.

Aconite shall be of such strength that it requires not less than 0.4 Mg. nor more than 0.5 Mg. per Gm. body weight to kill a guinea pig when tested in the following manner:

From the specimen to be tested a fluidextract is made according to the official process. Four guinea pigs are then carefully weighed and into two of them is injected beneath the skin of the belly an equivalent of 0.0004 Gm. of aconite for each gram of body weight and into the other two is injected 0.0005 Gm. per gram body weight. If at the end of twelve hours the first pair survive and the second pair are dead, the drug is of satisfactory quality. If the first pair die it is too strong; if the second pair survive it is too weak. If one of either pair lives and the other dies the test should be repeated.

Digitalis Group.—*Apocynum*, *convallaria*, *digitalis*, *scilla* and *strophanthus* are placed together by physiologists, as they have much the same physiologic action. As there is no satisfactory method of chemical standardization for any of these drugs, the Committee feels that the adoption of physiologic method of assay would be advisable.

Three types of test have been suggested for the standardization of these drugs (1) the dose required to kill a warm-blooded animal, as the guinea pig; (2) the amount required to produce arrest of the heart in a frog in a given period of time; (3) the degree of elevation of blood pressure in a warm-blooded animal. The last of these methods may be immediately excluded as being the least reliable of the three and also the most complex technically. Concerning the choice between the first two methods, while recognizing that there are valid arguments in favor of each, we are inclined to prefer the test upon the guinea pig. It is true that in the study of Edmunds and Hale (Hygienic Laboratory, Bull. No. 48) the frog test appeared to be somewhat more accurate, showing in no case an error of more than 10 per cent. There are, however, two serious objections to the frog method as an official process of assay. In all of these frog tests a time limit has to be given and the various time limits have ranged from one to twenty-four hours. According to the authors just quoted, the fatal dose for twelve hours is about $\frac{3}{4}$ of that for one hour. It is evident that the difference between the dose required to kill in one hour and that required to kill in twelve hours is largely a question of the rapidity of absorption. Now it may easily be that a preparation which is highly active may, for some reason, be comparatively slowly absorbed so that the one-hour test is a test not only of activity of the drug but of absorbability, which manifestly is not the purpose of the assay.

Another objection which seems to us almost insurmountable is the great variation in the susceptibility of frogs. In the first place, it is a well recognized fact that frogs of different species vary widely in their susceptibility to members of the *digitalis* group. It would therefore be essential to use always frogs of one species. This offers no trouble if the tests were to be carried out only in one part of the United States, but the species of frogs which are common in Maine and are not found at all in California. The most widely distributed frog, the *Rana pipiens*, does not occur west of the Sierra Nevada.

Not only do frogs of different species show variations in their susceptibility, but it is recognized that the season of the year influences this. According to a statement made by Dr. Hale in a discussion of this subject before the Philadelphia branch of the A. Ph. A. this difference is due simply to the effects of temperature and can be overcome by working always in a room of certain temperature. We are not familiar, however, with any experimental proof of this statement, and it seems, a priori, improbable. Moreover, there is reason to believe that even the same species of frog varies not only according to the time of the year but also with the locality from which it is obtained. Dr. Donaldson of the Wistar Institute of Anatomy has found a marked difference in the relation of total body weight to the weight of the central nervous system in frogs of the same species, obtained from different parts of the country. While this does not of course absolutely prove that there would be a difference in the susceptibility to digitalis it necessitates at least a careful study of the comparative susceptibility of frogs of the same species from different regions, before it can be taken for granted that they will be the same.

The only method of overcoming these obstacles would seem to be by comparing the preparation tested with that of a standard preparation. We are convinced that such a method of standardization is undesirable for pharmacopœial purposes. It would necessitate a distribution either by the Government or the Pharmacopœial Convention of a standard preparation and although the experiments of Houghton (Proc. A. Ph. A., 1909) indicate that tincture of *strophanthus* might be available for this purpose, such a standard would have to be tested almost continuously by the distributors and given out at comparatively short intervals. Chance deterioration in the standard might easily result in flooding the market with inferior preparations before the fact was discovered and rectified.

Guinea pigs, on the other hand, are obtainable in all parts of the world. They are already used for standardization of various remedies and their susceptibility to digitalis, as far as known, does not vary under ordinary conditions. Temperature, food, season, weight, and sex do not influence their reaction. We therefore recommend the use of guinea pigs for the determination of the physiological activity of drugs of this group. As the methods of assay for all the members of this group would be the same, we shall describe the test as applied to digitalis only.

Digitalis should be of such strength that when tested in the following manner it shall require not less than 0.35 Mg. nor more than 0.4 Mg. per Gm. of body weight to kill a guinea pig in twelve hours.

Method of Assay.—From the sample to be tested a tincture shall be made according to the official process; four guinea pigs are then carefully weighed and into two of them an amount of the tincture corresponding to 0.35 Mg. of digitalis per Gm. of body weight is injected beneath the skin of the abdomen and into the other two a quantity equivalent to 0.40 Mg. is injected. If both of the first pair survive and both of the last pair die the drug is of satisfactory quality. If, however, both of the first pair die, the sample is too strong or if both of the second pair survive, too weak. If of either pair one survives and one dies, the test should be repeated.

Suprarenal.—If the suprarenal glands remain official in the next revision of the Pharmacopœia, we believe that there should be some standard of strength introduced. As at present there is no chemical assay available and as the physiological test is one of the simplest of all pharmacological experiments, we recommend the introduction of the following method for the physiological assay of suprarenal glands.

Suprarenal gland should be of such strength that 1 Gm. injected intravenously into a dog shall produce a rise of a mean blood pressure within ten millimeters of mercury of that produced in the same animal by a dose of 0.001 Gm. of the pure active principle when tested in the following manner:

Method of Assay.—A dog weighing between five and fifteen kilograms is anesthetized by injecting hypodermically 0.008 Gm. of morphine sulphate for each kilo of body weight, supplemented with the use of such quantity of ether as shall be necessary to prevent pain. One of the larger arteries, as the femoral or carotid is then connected with a mercury manometer and the animal allowed to come from under the influence of the ether. No experiments should be begun until at least ten minutes has intervened after the withdrawal of the ether. At the end of this period, the normal pressure should be recorded for a period of at least three minutes and then a dose of 0.001 Mg. of pure active principle for each Kgm. of body weight is injected intravenously and the blood pressure observed for at least three minutes. At a period of not less than ten minutes after this injection, a dose of 1.0 Mg. of the sample to be tested is injected in the same manner and the pressure observed again for ten minutes. Ten minutes after the injection of this sample a second dose of the pure active principle of the same amount as the first injection is to be injected. The elevation of the blood pressure at the highest point reached after each injection above the pressure at the time the injection was made is then measured. The rise of blood pressure which was produced by the second injection should be within ten millimeters of the average of the first and third injection.

THE CHAIRMAN: We have with us to-day, one of the pioneers in the physiological testing of drugs. He was to present us a paper, but was unable to do so in time—Dr. E. M. Houghton, of Detroit. I will ask him to open the general discussion.

DR. HOUGHTON: Mr. Chairman and Gentlemen: I have listened to the papers read this afternoon on the subject of physiological assay with a great deal of interest. The Section should be congratulated upon the excellent papers read. While listening to them I recalled vividly to mind the situation exactly ten years ago, when I read a paper before the same Section on this subject. From the comments of the listeners of the previous paper, the writer was inclined to feel that he had entered the wrong pew, and that possibly physiological assay would never become a topic of much interest to the members of the American Pharmaceutical Association; but time certainly changes ideas as well as heals wounds, for to-day the subject is of enough interest to fill this room with expectant and interested listeners, and in fact we find the subject of physiological assay is being taken up in the foremost countries of the world and, instead of being condemned, is lauded as quite the proper method for satisfactorily determining the value of important drugs.

A number of questions have been brought up in the papers upon which I desire to offer a few comments, as follows:

Shall we use warm or cold blooded animals for test purposes? Some 14 or 15 years ago, when considering the feasibility of devising methods for the physiological assay of drugs, this question came up very forcibly, but, after two or three years of continuous experimentation on the subject, using a variety of animals, dogs, rats, mice, guinea-pigs, and frogs, I concluded that the latter animals were far and away the most desirable for the purpose intended, chiefly because they could be obtained at almost any time of the year in large quantities and in uniform size and species, also because in the case of the heart tonics the action of the drugs upon the heart muscle could be better studied, since paralysis of the respiratory centre does not produce death in these animals which have the faculty of breathing through the moistened skin when the lung ceases to act.

One of the gentlemen spoke of the use of cats. Personally I cannot believe these animals would ever become popular for this purpose. I well remember an incident that happened while I was doing post-graduate work at the University of Michigan, where we were employing cats for our experiments. We had a young cartman subsidized to bring us cats, but we could not get them at any reasonable price. Work became urgent

about the time of the Christmas Holidays, when one could get away from the classroom to better advantage, and I said to him: "John, can't you get us some cats somewhere?" He replied: "How many?" And I said: "Bring on as many as you can get hold of." Much to my surprise just after finishing my Christmas dinner, who should come up the steps but John, and informed me that he had a whole sleigh-load of cats—I believe there were about 35 of them. What to do with them was a serious question for the moment but not so serious as the disposition of anxious inquirers for lost pets. It had been with much misgiving, since this experience, that I have thought of using felines for laboratory experiments. It seems that John and a partner the night before had made a raid in the town, and we were to hear of it later. Any way so far as I am concerned I shall always feel like avoiding the use of these animals wherever possible, and I am sure that our vivisection friends would criticize us much more severely for using cats than where such animals as guinea-pigs or frogs were employed. For these reasons and others not mentioned it was found desirable to use frogs in place of warm-blooded animals. Since 1894 we have used them in great numbers in our work, and I have not seen any real need for changing the test animal.

There may be considerable variation in the frogs obtained from different sources at different times of the year, but it makes comparatively little difference as to the kind and quality of frogs used provided the variation in resistance is carefully noted by testing the standard under identically the same conditions. You must know the resistance of your frogs toward the standard by which you are to measure the value of the unknown.

For several years we have employed a tincture of strophanthus made according to the U. S. P. 1890, and have found the product to be very stable.

At this meeting I hoped to present a paper upon the particular subject of standards, and to bring to your attention a chemically-pure, crystalline strophanthin obtained from undoubted strophanthus Kombe seeds, but unfortunately the time was too short to fully complete the work, and I can only say that the strophanthin occurs in beautiful white crystals. The seeds contained in the original pods had been identified by Prof. Holmes of London, and were a special importation. I believe the use of this strophanthin as a standard would be of great importance, as it would be a decided step in advance. In the paper which will be published in the near future will be given full details as to method of isolation, identification and such, so that it should not be difficult for a trained chemist or pharmacist anywhere in the world, if they obtain the strophanthus Kombe seeds, to succeed in isolating the material for their standard that would be the same as that proposed.

As to the method of assay as discussed by Dr. Hale, this does not differ materially from methods that I have reported on several times during the past fifteen years. The chief element of difference is the time at which we read the end results, Dr. Hale preferring to examine the heart of the frog one hour after the administration of the poison. In England it has been decided to adopt three hours, while in my work I have used death as the final criterion for reading end results. I have some work under way at the present time to show exactly what influence the element of time may have in this matter, but am convinced that for practical purposes it is best to wait until sufficient time has elapsed for the animals to all succumb, rather than to make a determination from the readings made at any time before. However, there may not be a great difference in the final results obtained.

There are a great many questions in connection with the physiological assay of drugs that I should like to consider, but I do not wish to burden you with too much discussion. One point especially that I believe the forthcoming Pharmacopœial Revision Committee should keep carefully in mind is the importance of checking up any improvements in methods by proper attention to the physiological properties of the resulting products. To illustrate: in the 1900 Pharmacopœia it was decided to change the *menstruum* for

fluidextract of squill. The resulting product, as shown by a paper published in the *Journal of the A. M. A.* several years ago, when using the new menstruum, was very much inferior to that obtained by the old menstruum, at the same time presenting very great difficulties from a manufacturing pharmaceutical point of view. To a lesser extent the same evil occurred when the menstruum for the fluidextract of digitalis was changed to contain a smaller percentage of alcohol, the resulting fluidextract being very much inferior to that prepared where a menstruum approaching that used for the tincture of digitalis is employed. I hope these and other errors that crept in through the lack of application of physiological methods may be eliminated in the next edition of the *Pharmacopœia*.

As to standards, it seems to me that it would be wise for us to get together and in some way spell out what would be the best and simplest method, the method that would give the best results to the medical and pharmaceutical professions. As Dr. Wood remarks, there are four standards under discussion, or rather four methods, and it certainly would not be desirable to us to have four different standards. We ought I believe to adopt some unit for measuring the value based on chemically-pure strophanthin. A physiological unit such as I proposed last year in a paper read before the International Congress of Applied Chemistry in London, and published in the *Lancet*; I have called this a heart-tonic unit. The original unit was modified somewhat in a paper read before this Society last year, the unit as finally presented being: ten times the normal minimum fatal dose per gram body weight of standard test frogs kept under proper test conditions. This change seemed to be desirable, in order that the number of heart-tonic units in a given preparation of strophanthus or other preparation might not be too large and in a sense comparable to the number of units of antitoxin that are now administered in the treatment of diphtheria and other diseases. On the other hand, it seemed wise to have the unit sufficiently small in value, so that fractions would not have to be considered when one desired to use the drug in doses of a given number of units.

Dr. Hatcher called attention to the great variation in our notion of doses. Certainly the variations are appalling, and some of you may remember that in the paper I presented before the Section last year I called attention to the strength of the various preparations of the heart tonics, in heart-tonic units, when translated over into the doses given in the *U. S. Pharmacopœia*. I have in a work which will come out soon, attempted to call attention to some of these discrepancies, to see if we might simplify matters in that direction. Whether we shall be able to do so or not, I am not quite able to say. Lest I take too long, I think this is a good halting point, and I wish to say that it has been extremely gratifying that this question has broadened-out as it has, and I hope it will be possible for us to ultimately agree and adopt a standard not alone for this country but an international standard which will be recognized by all the civilized countries of the world as being the most desirable method of measuring the value of this important class of pharmaceutical products.

THE CHAIRMAN: We have with us this afternoon another pioneer—all these old men are pioneers in the science,—and I trust Dr. Sollman, of Cleveland, will tell us something of his experience.

DR. SOLLMAN: I have done very little in the way of standards, for a great many years, and I do not believe that I could offer anything in that connection, but I have pretty settled convictions on the general subject. It should be superfluous, but unfortunately it is not so, to affirm that standards are an absolute necessity for medical practice. If the physician does not receive them, the striking results which often follow are remarkable, sometimes, but they can not be utilized on that particular point any more. I have heard no one seriously question that when the chemical assay can be applied, it

should be applied. It is most convenient as a rule; it can be carried out in more places than the physiological assay. There are other advantages: it does not require the use of animals; animals are not easily obtained, and there is a serious objection in keeping them; so wherever the chemical assay can be used, no one would use a physiological assay. Now whether the physiological assay can be used within the scope of usefulness, is a thing that has to be determined by investigation; it has to be tried out whether the chemical or the physiological assay gives you the better results. I am convinced that for practical purposes either of those methods would give results of sufficient accuracy. For special scientific purposes, one or the other method might be better. I believe that the greatest accuracy could be obtained by the method which Dr. Hatcher detailed, and it has a further advantage from the scientific point of view, the very ingenious method of furnishing the end reaction with an especially delicate indicator, he can eliminate the difference of time reaction, and in that way can obtain an insight into the therapeutical difference. The theory on which it is based is very plausible, and it shows the special directions in which special methods may be needed. It may be, also, that that is the most feasible method. That is a thing that has to be worked out. I believe if the advocates of the different methods could be gotten together, and contrast their results in a broad-minded way—use each other's methods and become acquainted with them—it would not be at all difficult in that way to get a method which would be generally acceptable, and at the same time thoroughly practicable. I should very much like to see, Mr. Chairman, this Section pass a resolution requesting the American Pharmaceutical Association to recommend physiological standards of drugs to the U. S. P. Convention, for their serious consideration.

Motion seconded.

THE CHAIRMAN: If it is agreeable, I should like to ask Mr. Lyons to speak to that motion, and give us his views on the same question.

MR. LYONS: I believe now that the function of the physiological assay is a temporary one. I believe we are under way to chemical processes which will be all sufficient, but we have not yet arrived there. We must supplement our chemical knowledge, which is yet imperfect, by the physiological tests. The motion which has been made is just the motion I should have wished to offer here. Ten years ago the Committee on Revision of the U. S. P. were forbidden to consider physiological assays; they were not to be trusted; we were given the opportunity to make any number of experiments with chemical tests, and those of you who were present here this morning know that we found no end of trouble in arranging the tests, and in getting them anywhere near approximately accurate. Whether we should have adopted any single one of those tests is a question, but I hope we shall now induce the Convention to give the subject to a new committee. Whether any one individual method that has been proposed should be adopted, is a question. I wanted to offer one suggestion in connection with the question of unit. I should favor a heart- tonic unit, but it should not be a unit with a definite action that a tincture would produce on any animal, but I should have a heart- tonic unit that would be the effect produced by one milligram, or one-tenth of a milligram, or one-thousandth of a milligram: then you could test it on frogs, or on cats, or on anything.

MR. HALLBERG: Now after the pioneers have been heard perhaps the neophytes can get a word in. Mr. Chairman, I was in the category that was mentioned awhile ago, ten years since, and desiring to be progressive and up-to-date, the Chicago Branch arranged for some physiological assays and a demonstration, recently, and we admired the skill of the operator and the uniformity of the substance. We were very favorably impressed with the practicability of the scheme, but when we got to thinking over it, we

began to figure up something like this: the infusion of digitalis was used upon the frog, and figuring the average weight of a man as being something like myself, it would take 60 Gm. of digitalis—which is rather appalling. Then at the following meeting of the Branch we called in a number of physicians, and we had some more light thrown upon the subject, which impressed us very highly, and had a direct bearing upon this question here, that the constitution—particularly the nervous constitution and organization of the batrachia are not at all similar to those of the warm-blooded animals, and respond entirely different, and with very much indifference, to the effect of the cardiac principles; and, therefore, inasmuch as this was fairly demonstrated by the enormous amount that would be theoretically required, we concluded the frog was not the proper subject. I believe that experience has demonstrated that the guinea pig is more closely related to our make-up and organism, than any other animal—far more so than the cat. I believe if any animal is to be used, that the guinea pig, by every consideration, ought to be preferred. Now I am not sufficiently advanced as yet in the subject, to talk about the possibility of these units. I only desire to call your attention to a fact that we pharmacists have known for the last thirty years, that the cost of the difference in the strength and value of clinical preparations of digitalis, rests entirely in the character of the menstruum. If you take the same digitalis leaf and make a fluidextract, requiring I think 75 per cent. alcohol, you will have a preparation comparatively inert, as compared with a tincture made with 50 per cent. alcohol. The principles are not present in the drug, but have to be formed through the action of water, and unless there is sufficient water present in the menstruum you will not have the proper principles formed. Now you know the distinction between the infusion and the tincture.

THE CHAIRMAN: Will you kindly speak to the motion?

MR. HALLBERG: I am speaking to the paper. We pharmacists have got something to say about that—the tincture of digitalis has been shown, I believe, by all the speakers here, and emphasized by Dr. Hatcher, to be the most ideal preparation of digitalis, and it is for that reason that it is made with diluted alcohol, and there is sufficient water in it to form these principles. I am now ready to be convinced as to the practicability of introducing physiological assays into the Pharmacopœia. I am not opposed to it.

THE CHAIRMAN: The resolution is before you. Are there any objections to it?

MR. FRANCIS: With the Doctor's permission I would like to offer an amendment to his resolution.

THE CHAIRMAN: Will the Secretary please read the resolution?

THE SECRETARY: I believe the motion was that the Scientific Section favors the American Pharmaceutical Association recommending physiological standards to the serious consideration of the Pharmacopœial Convention.

MR. FRANCIS: I would amend that by adding to it the further recommendation that the President of the Association be requested to appoint a committee for the purpose of considering the standards, and determining the best of these, and their final adoption, for use; this committee to report to this Association, perhaps during the present session, or at the next annual meeting. It seems to me that the desirability of having such a committee appointed heartily commends itself, and scarcely requires argument.

MR. HALLBERG: I second that motion.

MR. REMINGTON: The Committee of Revision were met with a similar problem in the question of diphtheria antitoxin; the Committee of Revision accepted the situation, al-

though diphtheria antitoxin, and in fact all serums, were "turned down," if I may use the term, in the Convention; still it was absolutely necessary for the subject to be gone over by the Committee of Revision, and certainly nobody can be found to-day who will object to the conclusions obtained. Now the Committee on Revision met the question of forming a commission of bacterial experts, who considered that question, and the very same idea which I was glad to hear Dr. Sollman advocate, was carried out. That the present Convention will take favorable action upon these resolutions I feel very certain, because if it were necessary to take action during the progress of the revision, certainly it is most necessary to take it now. I don't altogether like Mr. Francis' amendment, because if the committee is to report to the American Pharmaceutical Association, it would leave the matter open for a whole year, and I certainly, for one, feel that this whole subject of physiological assay ought to be taken up at once, as soon as the Committee on Revision is formed; that is one of the very first steps that ought to be taken, so as to give as much time as possible, because some of the formulæ in the Pharmacopœia may depend on the results obtained by this Committee on Revision. I don't think there would be any objection to the appointment of a committee of experts. What has impressed me most to-day is the difference of opinion between these gentlemen who have worked so hard, and to such a valuable extent; but the thing to do is to all get together and work together and give a standard for the Pharmacopœia to use.

MR. FRANCIS: If my amendment is liable to be misconstrued—as it has been by Mr. Remington—I will withdraw it and ask to be permitted to offer it as an independent resolution at a later period. My sole idea was to have this Association appoint a committee to study this important subject, for the next ten or twenty years, and get the best results which have been obtained by the people who have been studying the subject.

THE CHAIRMAN: If Mr. Francis withdraws his amendment, then the motion as originally presented by Dr. Sollman, is that the Scientific Section favors the American Pharmaceutical Association recommending the physiological standard of drugs to the serious consideration of the U. S. P. Convention.

Carried.

MR. FRANCIS: I would offer a resolution as follows: In view of the great attention being paid to the subject of physiological assay by many workers in this country and Europe, and as quite a number of physiological methods have been discussed, for the standard of some of the important drugs, I would suggest that a committee of not less than five members be appointed by the President of the American Pharmaceutical Association to consider such methods, and report at the next meeting, said committee to be known as the Committee on Physiological Assays.

THE CHAIRMAN: That is a resolution that will have to go up to the general session of the Association. Are there any further remarks?

MR. VANDERKLEED: In regard to these apparent differences, I would assure those who have done no work in physiological assay, that the differences to-day are less than in many of the chemical assays now in the Pharmacopœia, and just as concordant results will be obtained by any of these methods, and by the different workers, as was the case by some of our chemical methods.

MR. LYONS: If we have a committee appointed, I would suggest that a man be selected who shall be able to organize the work Dr. Francis talks of here; a single man would be better than five, and he would be responsible.

MR. TURNER: Why would it not be more expedient for us to have the Chairman of

the Scientific Section appoint the Committee, and let the report be made to this Section next year. Is there any objection to that?

MR. FRANCIS: I would naturally assume that the committee would report to the Scientific Section.

THE CHAIRMAN: It would not—unless it was a committee of the Scientific Section; it would report to the Association direct.

MR. FRANCIS: The appointment of the members of this committee is a mere matter of detail. What I have in mind is that we have pharmacologists in the manufacturing establishments, gentlemen in the public service, and also gentlemen who are connected with the teaching staffs of various schools, working on this subject, and they are practically the ones who are doing all of this work that is being done to-day. My idea is to have a committee of such dignity that the results they obtain will have the proper consideration, but whether that committee should be appointed by the Chairman of this Section, or by the Society at large, is a matter of no importance to me.

THE CHAIRMAN: I am not sure, but I should imagine that the work of a committee of this kind would entail the expenditure of some money, and so far as this Section is concerned it has no available funds; therefore, it would perhaps be better to follow Dr. Francis' original idea and have a committee of the Association.

The motion of Mr. Francis was here voted upon and carried.

THE CHAIRMAN: Mr. Sayre is on the program for tomorrow, on a closely related subject, "Gelsemine and Other Constituents of Gelsemine Root, and Remarks on Assay of Preparations"; and if there is no objection I would like to have him briefly present this matter to you at the present time.

MR. SAYRE: Mr. Chairman, this is rather an unexpected call. I have samples in my room which I expected to present, but I can present those at some other time. I will simply present the paper by title at this time, and if the Chairman will allow me I will be very glad to show these various samples to the members at some other meeting.

"GELSEMININE AND OTHER CONSTITUENTS OF GELSEMIUM."

L. E. SAYRE.

The work of the past year upon gelsemium has been directed mainly to the study of the alkaloid gelseminine. The crude material which was reported on last year was obtained from 50 pounds of gelsemium root. See Proceedings, 1909. This crude product was in the form of a soft extractive, having highly alkaloidal properties.

What has been recognized hitherto as gelseminine is a soft resinous alkaloidal residue remaining after gelsemine hydrochloride has been crystallized from alcoholic solution of the mixed alkaloids. Thompson* first announced this as a second alkaloid. Cushny regarded it as a powerful poison resembling coniine. Whether this is a distinct alkaloid, a polymerized form of gelsemine, a mixture of various uncrystalline principles of unknown composition, has not been determined. Our work this year has indicated that it is a complex substance. We have been able to separate

* Pharmaceutical Era, 1887, p. 3.

it into at least two distinct bodies, having different solubilities and different reactions with agents.

The crude gelseminine for our work was obtained by the Thompson method and by two different modifications of it, as follows:

METHOD A.

A one-fourth portion of the soft alcoholic extract obtained from 50 pounds of drug (see Proceedings, 1909, p. 902) was treated with a 2 per cent. solution of H_2SO_4 , the acid solution thoroughly washed with chloroform by which all the gelsemic acid seemed to be removed. The acid solution was made alkaline and shaken with ether-chloroform (5 to 1) until exhausted and the separated ether layer washed with 2 per cent. HCl. On concentrating this liquid in vacuo, the residue consisted mostly of soft resinous-like reddish gelseminine hydrochloride, seemingly very little or no white alkaloid, gelsemine, being present.

METHOD B.

In this case the soft extract ($\frac{1}{4}$ portion) was first treated with an equal bulk of lime and dried, after which it was treated with 2 per cent. H_2SO_4 . The acid solution was washed with chloroform and the subsequent treatment was precisely similar as in Method A, using the solvents in the same order. The final acid aqueous washing of the chloroform-ether solution of the alkaloids was concentrated in vacuo to small volume. The evaporation was continued to dryness and the dry product powdered. The powder, which was quite dark, was treated with alcohol. This left 2.1 Gm. of the colorless salt, gelsemine hydrochloride.

The separated alcohol solution was concentrated and set aside to crystallize, but no more crystals appeared. The concentrate corresponded to Thompson's gelseminine. It was a red, soft, gummy, resinous mass, with strong alkaloidal reaction, and had a very bitter taste.

METHOD C.

A third portion, consisting of the remaining half of the original extract, after making alkaline, was extracted with benzol. The solution was filtered and shaken out with 2 per cent. H_2SO_4 ; the acid solution was then washed with chloroform to remove gelsemic acid. The subsequent treatment with the immiscible solvents was the same as in Method A, the liquids being used in the same order. The acid solution was then concentrated in vacuo to small volume and set aside to crystallize. Colorless crystals of gelsemine hydrochloride separated, which, after washing with U. S. P. alcohol and drying in vacuum desiccator, weighed 11.5 Gm. This method gave the largest yield of gelsemine hydrochloride. The liquid from which the crystals were removed gave, on concentration, a residue characteristic of Thompson's gelseminine hydrochloride.

All of these products (crude gelseminine) from Methods A, B and C were separately subjected to further examination in the hope of obtaining more definite information concerning this soft, resin-like alkaloid.

It may be well to state in passing that crude gelseminine gives with manganic oxide and H_2SO_4 a purple color, while gelsemine gives a cherry-red. The final color of gelsemine merges into green, fading to a yellow.

The suspicion has been entertained that the so-called gelseminine consists of possibly a mixture of coloring matter and another alkaloid persistently combined therewith. The persistent "combination" referred to has not thus far been possible to break up by any ordinary means of alkaloidal separation. Thompson's gelseminine is, by another theory, a derivative of the colorless alkaloid or of esculin, having somewhat the same relation to gelsemine, as does chinoidine to quinine. Indications seem to be that gelseminine, when obtained pure, will prove itself to be a colored alkaloid, producing colored salts.

It might be well to state here also that the physiological tests of the crude gelseminine hydrochloride, formerly produced by us, indicate that it differs from gelsemine in being about ten times more toxic than gelsemine.* Cushny found that its action was very similar to that of coniine, was more depressent to the central nervous system, and had mydriatic properties, but as such, was too irritating for practical use. Some authorities state that the effects of the crude drug are mainly due to the uncrySTALLINE alkaloid gelseminine, and not the crystalline gelsemine. In order to study the constitution of this gelseminine, it is evident that it must be brought to a more definite physical and chemical condition. In attempting to do this, the three crude gelseminines, A, B and C., as above stated, were made the starting point.

Examination of Crude Gelseminine (A).—This consisted of a reddish colored product, which when dried in a current of warm air weighed 19.92 Gm. This product, by solution in acidulated water, precipitation by ammonia, washing out by immiscible solvents, twice repeated, yielded crude crystals of the colorless gelsemine hydrochloride, which when purified weighed 0.6556 Gm. It was thus made clear that a fair proportion of the so-called crude gelseminine (A) consisted of the alkaloid gelsemine.

All attempts to purify or crystallize the remaining soft, resinous, alkaloidal substance from which the gelsemine hydrochloride had been separated was of no avail. It persistently remained as a colored mass which dried, in a thin layer, into a hygroscopic, scaly salt.

Examination of Crude Gelseminine (B).—Treated with absolute alcohol it was found to be not entirely soluble. 6.5 per cent. remained undissolved, but the insoluble portion could not be deprived of its coloring matter. It was probably a mixture of gelsemine and gelseminine.

* Dr. E. D. Reed, Pharmacologist. See Proceedings A. Ph. A., 1908, p. 855.

1.6355 Gm. of crude gelseminine (B) containing 17 per cent. of moisture, corresponding to 1.3574 Gm. of dried material, was precipitated from an acidulated solution by means of ammonia in excess.

The liquid containing the suspended alkaloid was transferred to a filter and continuously washed with ammoniacal water until the washings ceased to show presence of alkaloid.* The residue on the filter was then transferred to ammoniated water and allowed to macerate for several hours. The liquid was transferred to a filter and again washed as before. The insoluble precipitate was carefully dried in a vacuum desiccator. It weighed 0.4752 Gm., thus indicating a distinct separation. One of these separated products (insoluble in ammonia) we designate as gelseminine (B_1), the other (B_2).

The ammoniacal filtrate was separated into three portions; the first portion passing through the precipitate and filter was of a pinkish color; the second portion was less colored, and the third portion colorless. These three solutions were separately dried in a vacuum desiccator, which was supplied with a current of air made dry by a battery of Woulfe bottles containing sulphuric acid, and finally a U-tube of calcium chloride, a partial vacuum being maintained. Practically dry products were thus obtained, (Gelseminine, B_2).

The first residue† was brittle and of a reddish color. The second residue was of a lighter yellow, and the third was practically colorless. All three were alkaloidal—the third, colorless residue, was also alkaloidal and contained insoluble material. The total weight of the alkaloid soluble in ammonia was 1.1584.

(B_1): The precipitate insoluble in ammonia was first dissolved in dilute sulphuric acid, transferred to a separator, made alkaline with ammonia; the alkaline solution washed with chloroform, which readily extracted the colored alkaloid. The chloroform solution was transferred to a second separator, and after washing, the distilled water was washed with dilute hydrochloric acid. This last washing removing practically all of the color and the alkaloid. This was placed in a vacuum desiccator and dried as was the former solution. The weight was 0.4752 Gm.

It should be noted here that the alkaline aqueous red solution (B_2) when washed with chloroform, yielded practically no color or alkaloid, the coloring matter as well as alkaloid remaining in the alkaline fluid. On the other hand, the alkaloid from B_1 , with its red color was readily transferred to chloroform when its solution, made alkaline, was shaken out by that solvent.

Examination of crude Gelseminine (C).

* We have noted before that some of the alkaloids of gelsemium seemed to be remarkably soluble in ammonia.

† This was necessarily contaminated with a small proportion of NH_4Cl .

Treated with absolute alcohol, this was found to be entirely soluble.

1.435 Gms. of Gelseminine (C) containing 10 per cent. of moisture) was taken, precipitated by ammonia, and succeeded by the same treatment as that to which the former product (B) was subjected. The precipitate insoluble in ammoniacal water weighed 0.0835 Gm. (5.81 per cent.), and had the same characteristics as the former insoluble precipitate.

These three, apparently distinct, alkaloids (gelsemine, gelsemoidine (?) and gelseminine) will be studied carefully in the future.

PHYSIOLOGICAL STUDY OF THE THREE ALKALOIDS.

Professor H. W. Emerson makes preliminary reports on the pharmacological examination of these various alkaloidal products upon frogs, as follows :

1. Gelsemine Hydrochloride. (colorless).

An aqueous solution of 0.010 Gms. to Cc. was employed.

Weight of frog 39.8 Gms. Normal heart rate 60 a minute.

3 : 45 p. m. Injected 0.3 Cc. of the solution into the lymph sac of the frog. 3 : 45 p. m. Heart rate 52. 3 : 50 p. m. Heart rate 40. 4 : 00 p. m. Heart rate 35. The heart rate lowered and the amplitude increased. 4 : 05 p. m. heart rate 32.

4 : 05 p. m. Injected 0.5 Cc. 4 : 10 p. m. Heart rate 36.

4 : 20 p. m. Injected 0.5 Cc. more. 4 : 30 p. m. Heart rate 30. 4 : 45 p. m. Heart rate 24. 5 : 00 p. m. Heart rate 24.

5 : 05 p. m. Injected 0.5 Cc. more. 5 : 10 p. m. Heart rate 11 and weak. 5 : 15 p. m. Heart rate 5 and very weak.

Gelsemine Hydrochloride first slows the heart and causes more complete contraction and expansion. As the dose is increased, the beats are slower and slower, and the heart continually grows weaker.

2. Crude Gelseminine Hydrochloride (soft resinous extractive). This preparation was made in the same manner and of the same dilution as the first.

Weight of frog, 68.5 Gms. Normal heart beat 61.

9 : 05 a. m. Injected 0.2 Cc. of this solution into the lymph sac of a frog. 9 : 15 a. m. Heart rate 60. 9 : 25 a. m. Heart rate 60.

9 : 35 a. m. Injected 0.3 Cc. solution.

9 : 42 a. m. Heart rate 36. 9 : 48 a. m. Heart rate 30. 10 : 02 a. m. Heart rate 30.

10 : 03 a. m. 0.5 Cc. solution injected.

10 : 08 a. m. Heart rate 28. 10 : 15 a. m. Heart rate 28. 10 : 52 a. m. Heart rate 24.

10 : 55 a. m. Injected 0.5 Cc. solution.

11 : 00 a. m. Heart rate 18. 11 : 10 a. m. Heart rate 18. 11 : 25 a. m. Heart rate 18. 11 : 45 a. m. Heart rate 18. 12 : 00 a. m. Heart rate 14 and weaker. 12 : 40 p. m. Heart rate 12 and weaker. 1 : 00 p. m. Heart

rate 10. 1:50 p. m. Heart rate 10. 2:10 p. m. Heart rate 8. 2:37 p. m. Heart rate 5. 2:45 p. m. Heart ceased to beat.

3. Gelseminine (B₂) (soluble in NH₄OH). The solution of this preparation was made in the same manner and of the same strength as the first. Weight of frog, 52 Gms. Normal heart rate, 60.

9:47 a. m. Injected 0.2 Cc. of solution.

9:52 a. m. Heart rate 51. 10:04 a. m. Heart rate 51.

10:05 a. m. Injection 0.5 Cc. solution.

10:15 a. m. Heart rate 50. 10:39 a. m. Heart rate 60.

10:45 a. m. Injected 0.5 Cc. of the solution.

10:50 a. m. Heart rate 45. 11:05 a. m. Heart rate 50. 11:25 a. m. Heart rate 50.

11:30 a. m. Injected 0.5 Cc. of the solution.

11:45 a. m. Heart rate 24. 12:00 m. Heart rate 24. 12:40 p. m. Heart rate 21.

12:45 p. m. Injected 0.5 Cc.

1:05 p. m. Heart rate 18. 1:35 p. m. Heart rate 18.

1:50 p. m. Injected 0.5 Cc.

2:00 p. m. Heart rate 21. 2:25 p. m. Heart rate 28. 2:40 p. m. Heart rate 29.

2:45 p. m. Injected 0.5 Cc.

3:20 p. m. Heart rate 25. 3:30 p. m. Heart rate 25. 5:00 p. m. Heart still beating. 6:00 p. m. Heart still beating. 8:00 p. m. Heart still beating. This preparation does not exert as marked a slowing of the heart as did gelsemine (colorless) and crude gelseminine (soft extractive.)

4. *Gelseminine* (B₁).—This solution was made in the same way and of the same strength as the preceding solutions. Weight of frog, 33 Gm. Normal heart rate, 65.

10:40 a. m. Injected 0.2 Cc. of this solution.

10:55 a. m. Heart rate 60. 11:10 a. m. Heart rate 54. 11:15 a. m. Heart rate 49. 11:30 a. m. Heart rate 40.

11:30 a. m. Injected 0.4 Cc. of the solution.

11:45 a. m. Heart rate 30. 12:00 m. Heart rate 28. 12:40 p. m. Heart rate 26. 1:05 p. m. Heart rate 23.

1:10 p. m. Injected 0.5 Cc.

1:40 p. m. Heart rate 10. 1:52 p. m. Heart rate 8. 1:57 p. m. Heart rate 6. 2:20 p. m. Heart rate 5. 2:40 p. m. Heart ceased to beat.

Experiments to determine toxicity of the different preparations:

The preparations were each made 0.010 Gm. of the alkaloidal salt to the Cc.

Preparation No. 1. Gelsemine hydrochloride (colorless).

Preparation No. 2. Gelseminine hydrochloride (soft ext.).

Preparation No. 3. Gelsemoidine (?) (soluble in ammonia, B₂).

Preparation No. 4. Gelseminine hydrochloride (insoluble in ammonia, B₁).

Four frogs of about equal weight—weights from 30 to 35 Gm.—were taken :

Experiment 1.

	10:00 a. m.	10:30 a. m.	11:00 a. m.	11:30 a. m.	12:30 p. m.	3:00 p. m.	8:00 p. m.	8:00 a. m.
Prep. 1....	0.7 Cc.	Normal.	0.5 Cc.	Very weak.	Dead.			
Prep. 2....	0.7 Cc.	Nearly normal.	0.5 Cc.	Weak.	Very weak.	Very weak.	Very weak.	Dead.
Prep. 3....	0.7 Cc.	Nearly normal.	0.5 Cc.	Excited.	Very weak.	Very weak.	Dead.]	
Prep. 4....	0.7 Cc.	Quite depressed.	0.5 Cc.	Dead.				

Experiment 2.

	10:00 a. m.	10:30 a. m.	11:00 a. m.	11:30 a. m.	12:00 a. m.	3:00 p. m.	6:00 p. m.	8:00 a. m.	10:00 a. m.
Prep. 1.	0.1 Cc.	Normal.	0.1 Cc.	Depressed.	0.1 Cc.	Depressed.	Dead.		
Prep. 2.	0.1 Cc.	Normal.	0.1 Cc.	Excited.	0.1 Cc.	Excited.	Depressed.	Dead.	
Prep. 3.	0.1 Cc.	Normal.	0.1 Cc.	Slightly depressed.	0.1 Cc.	Depressed.	Very weak.	Dead.	
Prep. 4.	0.1 Cc.	Normal.	0.1 Cc.	Depressed.	0.1 Cc.	Depressed.	Very weak.	Nearly dead.	Dead.

Experiment 3.

	10:00 a. m.	10:30 a. m.	12:00 m.	3:00 p. m.	6:00 p. m.	8:00 a. m.	10:00 a. m.	12:00 a. m.	4:00 p. m.	6:00 p. m.
Prep. 1.	0.1 Cc.	Normal.	Normal.	0.1 Cc.	Depressed.	Dead.				
Prep. 2.	0.1 Cc.	Excited.	Excited.	0.1 Cc.	Excited.	Nearly normal.	0.1 Cc.	Excited.	Dead.	
Prep. 3.	0.1 Cc.	Normal.	Slightly excited.	0.1 Cc.	Depressed.	Slightly depressed.	0.1 Cc.	Very depressed.	Very depressed.	Dead.
Prep. 4.	0.1 Cc.	Normal.	Normal.	0.1 Cc.	Depressed.	Normal.	0.1 Cc.	Depressed.	Depressed.	Slightly depressed.

SUMMARY.

The preliminary physiological results seem to show :

1st. That gelsemine hydrochloride, contrary to statements formerly

made by pharmacologists, has an inherent power as a heart depressant, preceded by a period of excitation.

2d. That the alkaloid soluble in ammonia (B_2), which if found to be a separate alkaloid we may name gelsemoidine, is less powerful than gelsemine as a heart depressant.

3d. The alkaloid gelseminine (insoluble in NH_4OH), B_1 , is depressant and less toxic than any other one of the poisonous principles. They all seem to exert, in different degrees, a paralyzing action.

It is understood that this is but a preliminary report. Tracings have been made of this work, and similar tracings will be made, using larger animals. In studying relative toxicity others observations were made which will be reported later.

ANALYSIS (COMBUSTION) OF GELSEMINE HYDROCHLORIDE.

The combustions of Gelsemine Hydrochloride were carried out in the usual way, using a silver spiral to take care of the chlorine and a reduced copper spiral to break up nitrogen oxide compounds.

Combustions for carbon and hydrogen.

No. 1. Carbon 66.48 per cent. Hydrogen 6.46 per cent.

No. 2. Carbon 66.34 per cent. Hydrogen 6.41 per cent.

Combustions for Nitrogen.

No. 1. Nitrogen = 5.68 per cent.

No. 2. Nitrogen = 5.59 per cent.

Carius Method for determination of chlorine.

No. 1. Chlorine = 13.00 per cent.

No. 2. Chlorine = 13.60 per cent.

Oxygen by Differences.

No. 1. — 7.78.

No. 2. — 8.66.

Formula for Gelsemine Hydrochloride, using the atomic weights of United States Pharmacopœia. $H = 1$.

$C_{16}H_{16}NOHCl$.

Percentage of,

II.

Above Formula.	Obtained by Combustion.
C = 67.307 per cent.	{ 66.48 per cent. 66.34 per cent.
H = 6.458 per cent.	{ 6.46 per cent. 6.41 per cent.
N = 5.623 per cent.	{ 5.68 per cent. 5.59 per cent.
O = 6.410 per cent.	{ 7.78 8.66 } By difference.
Cl = 14.202 per cent.	{ 13.00 13.06 } By Carius.

The formula then for the alkaloid would be $C_{14}H_{14}NO$.

It will be noted that this is a different molecular formula for this alkaloid than that obtained by Thompson and by Gerrard (Phar. Era, Jan. 1887, p. 3).

ASSAY OF PREPARATIONS OF GELSEMIUM.

In the Proceedings of the American Pharmaceutical Association ('08, p. 856), our experience in the assay of preparations of Gelsemium are recorded. We there recommend the Webster process. Since that time we have been obliged to employ less elaborate methods. This has been brought about by our connection with the State Drug Laboratory, for the analyses of drugs under the Pure Food and Drug Law. In this work it is frequently necessary to *quickly* separate the grossly substandard material from the standard. We have found that this can be done best by a short and rapid process; a process that will give at least approximate results. For this purpose I have much respect for Mayer's Reagent in estimating alkaloids. We quite agree with Dr. Lyons,* that the precipitate produced by this reagent, is of a sufficiently constant composition as to be available for purposes of gravimetric estimations. With few exceptions, when approximate results are contemplated, these precipitates are available. In the case of Gelsemium, when we have a mixture of colorless and colored alkaloids to deal with, and when titration, consequently, is difficult and uncertain, the process of precipitation is especially advantageous. For this purpose, the alkaloidal solution must be brought to a certain dilution, the alcohol driven off of the preparation by a low heat and the solution acidulated. The reagent is then added in excess, the precipitate allowed to stand several hours before collecting, washed carefully (washing filter rather than the precipitate), dried at 100° C. and weighed. By this method we have been able to obtain as concordant results as by the more elaborate processes, and I may add, we have been somewhat surprised at the reliability of these results. If the analyst establishes for himself the relation between the weight of the Mayer's reagent precipitate (obtained from solution of uniform dilution), and the weight of the combined alkaloids of gelsemium, which can be done by the more elaborate processes, he can safely employ the Mayer's reagent as above indicated and obtain reliable results concerning the alkaloidal strength of gelsemium preparations. We have proven this satisfactorily to ourselves by repeated experiments with "unknowns" worked out by ourselves and others in the laboratory.

THE CHAIRMAN: The Chairman desires to apologize to the readers of the previous papers for his remissness in not giving them an opportunity to close the discussion, but he took it for granted that the disposition made of the matter was satisfactory. We now have before us two papers on alcohol; one of them being "Determination of Methyl

* Amer. Jour. of Pharmacy, Jan. 1887, p. 5.

Alcohol in Ethyl Alcohol," by H. Englehardt and H. W. Jones. They not being present we will pass the paper by title. The other paper is on "Commercial Alcohol and the U. S. P. Requirements," by Samuel L. Hilton. This paper contains some important matter which I think we should consider and act upon.

Mr. Hilton here read his paper.

COMMERCIAL VS. U. S. P. ALCOHOL.

BY S. L. HILTON.

For the past year I have collected specimens of as many different brands of alcohol as I have been able to procure on the market in Baltimore and Washington, for the purpose of careful examination, as to conformity to the requirements of the U. S. P. and also, as to whether the requirements of the U. S. P. are too rigid or deficient.

Of the fifteen examinations tabulated below, the first four conform to all of the requirements of the U. S. P. and were purchased from one manufacturer at four different times during the year; samples No. XI and XII also conform to the present standard, the remaining samples, nine, are below the requirements and were rejected. They all show an excessive amount of total solids, decided reactions for tannin and aldehyde, and excessive amounts of organic impurities; all samples were free from methyl alcohol.

For many years and previous to 1906 a large amount of the alcohol of commerce was composed of what is known as heads and tails, that is the first and last parts of the distillate, both of which are heavily contaminated with congeneric products which render alcohol unfit for medicinal purposes. In a product of this kind there are more than forty of these congeneric products, many of which are difficult of detection, and the U. S. Pharmacopœia should prescribe more definite requirements for the discovery of them than the mere blotting paper test. In the best samples I have examined furfurol is always present in amounts varying from $\frac{1}{800}$ of 1 per cent. to $\frac{1}{8000}$ of 1 per cent., while I have not attempted the isolation of other congeneric products I believe that satisfactory tests can be devised whereby the more important of these products can be detected easily and a maximum standard for them adopted.

The test for weighable residue is indefinite, the U. S. P. directs that 50 Cc. of alcohol be evaporated in a clean glass vessel, no color or weighable residue should remain. What temperature should be used for the evaporation? The temperature should be sufficiently high to drive off all volatile matter and the residue I would suggest be dried at 115° C., the vessel and contents should be cooled in a dessicator for at least half an hour before weighing. With respect to what is a weighable residue, what is meant? A weighable residue determined on an ordinary prescription balance would mean something more than .001, while with an analytical balance .0001 is

easily detected. The German Pharmacopœia is more definite in this particular and states that the residue should not weigh more than .0005, this standard is specific as all standards should be whenever possible and I would therefor then suggest that the evaporation of 50 Cc. of alcohol for residue be conducted at 115° C., cooled in a dessicator for at least one half hour, and should not weigh more than .0005.

The spontaneous evaporation is not very satisfactory, for the reason, it is slow, the product is likely to become contaminated with foreign matter and the treatment of the residue with sulphuric acid does not differentiate what products remain.

Potassium hydroxide tests show presence of both aldehyde and tannin, some means should be used to distinguish each.

The silver nitrate test is exceedingly sensitive and perfectly satisfactory.

The methyl alcohol test should be more delicate, the present test does not claim to detect less than 2 per cent.

From the examinations I have made I am convinced that Alcohol that has been stored in wooden barrels, no matter how carefully the barrel has been previously prepared, will always show the presence of tannin and if kept for any length of time in the barrel is likely to contain oxidation products. No sample that had been stored and shipped in barrels came up to the requirements of the U. S. Pharmacopœia. Here I desire to call attention to the fact that the regulations and instructions concerning distilled spirits are exceedingly explicit and require distillers to place distilled spirits in wooden containers known and described in the regulations of the Internal Revenue Bureau, as a distiller's package, while these packages are no doubt satisfactory for spirits used as beverages they are far from being so for high test alcohol; however, under the same regulations provisions may be made whereby metal, glass and earthenware containers can be used, provided they are encased in wood in such a manner that the casing can not be removed from the vessel without destroying the utility of both; however no incased vessels are permitted to be used, by distillers, unless one of said vessels, or a model thereof, has been presented to the Commissioner of Internal Revenue and received his approval. Herein lies the crux of the situation, and if the American Pharmaceutical Association through its officers will take up this matter with the Commissioner of Internal Revenue, present in a proper manner the facts, I am sure a form of package known as a glass carboy or tinned iron can, when properly encased would be permitted to be used as a distiller's package and thereby the retail druggist would be enabled to obtain his alcohol pure and free from contamination, at a fair price, and provided it was properly distilled and purified would conform to all of the requirements of the U. S. Pharmacopœia.

Sample	I	II	III	IV	V	VI	VII
Appearance	clear colorless agreeable odor	clear colorless agreeable odor	clear colorless agreeable odor	clear colorless agreeable odor	clear colorless agreeable odor	clear colorless agreeable odor	clear colorless agreeable odor
Specific gravity .....	.81672 94.74	.81056 96.27	.81627 94.90	.81511 95.15	.81725 94.31	.81771 94.58	.81681 94.75 per cent.
Miscibility	perfectly	perfectly	perfectly	perfectly	perfectly	perfectly	perfectly
Volatilization and boiling-point	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.
Reaction	neutral	neutral	neutral	neutral	neutral	neutral	neutral
Residue and test for tannin with FeCl ₃ .....	.0002 no reaction	.0003 no reaction	.0002 no reaction	.0003 no reaction	.008 slight reaction	.001 decided reaction	.0025 slight reaction
Evaporation from paper	no foreign odor	no foreign odor	no foreign odor	no foreign odor	slight odor	slight odor	slight odor
Spont. Evap. and Test with H ₂ SO ₄	colorless resi- due very slight red color	colorless resi- due no color	colorless resi- due no color	colorless resi- due no color	yellow residue decided reaction	brown residue decided reaction	slight yellow residue slight reaction
Potassium hydroxide	no color	no color	no color	no color	no color	no color	yellow
Silver nitrate	no opales- cence, no color after 6 hours	no opales- cence, no color after 6 hours	no opales- cence, no color after 6 hours	slight opales- cence no color after 6 hours	slight brown color brown ppt. after 6 hours	reddish color brown ppt. after 6 hours	brown color slight brown ppt. after 6 hours
Methyl alcohol	negative	negative	negative	negative	negative	negative	negative

Sample	VIII	IX	X	XI	XII	XIII	XIV	XV
Appearance	clear colorless agreeable odor	clear colorless agreeable odor	clear slight col. foreign odor	clear colorless agreeable odor	clear colorless agreeable odor	clear slight col. agreeable odor	clear slight col. agreeable odor	clear slight col. agreeable odor
Specific gravity .....	.81609 94.92	.82048 93.76	.82152 93.48	.81566 95.02	.81449 95.32	.81597 94.92	.81469 95.78	.81554 95.03 per cent.
Miscibility	perfectly	perfectly	perfectly	perfectly	perfectly	perfectly	perfectly	perfectly
Volatilization and boiling-point	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.	volatile boils at 78° C.
Reaction	neutral	neutral	slight acid	neutral	neutral	neutral	neutral	neutral
Residue and test for tannin with FeCl ₃ .....	.0027 decided reaction	.0005 slight reaction	.0009 decided reaction	.0002 no reaction	.0003 no reaction	.0015 slight reaction	.0019 slight reaction	.0013 slight reaction
Evaporation from paper	slight odor	slight odor	disagreeable odor	slight odor	no odor	disagreeable odor	slight odor	no odor
Spont. Evap. and test with H ₂ SO ₄	brown residue decided reaction	light yellow residue slight reaction	slight color no reaction	no color no reaction	no color no reaction	brown color decided reaction	brown color decided reaction	brown color decided reaction
Potassium hydroxide	dark yellow	yellow	yellow	no color	no color	yellow	yellow	yellow
Silver nitrate	brown color heavy brown ppt. after 6 hours.	slight brown color after 6 hours	slight brown slight brown ppt. after 6 hours	slight opalescence slight color after 6 hours	slight opalescence slight color after 6 hours	dark brown color brown ppt. in 6 hours	brown color brown ppt. in 6 hours	red brown color brown ppt. in 6 hours
Methyl alcohol	negative	negative	negative	negative	negative	negative	negative	negative

MR. HILTON: I would further like to state that in all the specimens of alcohol I have examined, I am firmly convinced that the alcohol with the exception of heads and tails, as it leaves the still conforms to the present requirement of the U. S. Pharmacopœia, and the trouble is entirely with the form of package in which it is stored and shipped.

MR. HALLBERG: I would like to ask Mr. Hilton whether he means all the alcohol, or the middle run only?

MR. HILTON: Well, as I understand it, the first portion of the distillate that comes off from the batch should be rejected, and likewise the latter portion. The middle portion, that is being put out by the manufacturer to-day, will conform to every one of those requirements, even the requirements I have suggested, without any trouble, provided it is not stored in a wooden container. If it is stored and shipped in a glass or tin or iron container, it will conform to those requirements. I have taken up the matter with the officials of the Bureau of Chemistry in Washington, with regard to a galvanized steel container, and they have demonstrated by experiment that there is some action which takes place after the alcohol is stored in a galvanized steel container, which produces quite a number of oxidation products. I intended to bring along with me a sample of so-called commercial alcohol that you could all see. This sample was taken from a barrel that was purchased by the College of Pharmacy in Washington, tax-free, shortly after it was transferred to glass containers and when the alcohol was taken from the barrel it had a decidedly strong odor of ethyl nitrite, showing that there had been some action whereby ethyl nitrite had been generated simply by the product remaining in the wooden barrel.

MR. HALLBERG: Mr. Chairman, the distiller sends three kinds of alcohol out from the run—heads and tails, known as alcohol, and a middle run known as cologne spirits. Now of course to be U. S. P. it should be cologne spirits, or middle run. There are only 20 barrels of middle run, in a run of 100. There are about 30 heads; about 20 to 30 middle runs, and about 40 tails. Now formerly we could go to the distiller and get the middle run—if you knew how—and pay alcohol price, for cologne spirits; but now they sell all of it, heads, tails and middle run, as alcohol, and it is only by accident that you get U. S. P. Alcohol. I believe Mr. Hilton's contention is correct, provided the alcohol is middle run, but if it is heads or tails he will find it does not conform to the U. S. P. requirements.

MR. HILTON: I will state in answer to Professor Hallberg's remarks, that I had one lot of alcohol which was marked "Pure grain distillate," and the other marked "Cologne Spirits," and if the two had been submitted to any committee, without their knowing which was which, they would be unanimously of the opinion that the "pure grain distillate" was the cologne spirit—showing that the cologne spirit had been stored in the barrel for months, and in shipping the coating of glue on the inside of the barrel had been broken, which allowed this alcohol to sufficiently leech the wood to produce certain secondary products and so contaminate the alcohol that it was not equal to a presumably lower grade that was sold under the present requirement of pure grain distillate. Now if we can get the Internal Revenue Department to allow the form of package I have suggested as a distiller's package, it will not cost the retail druggist or the manufacturer one cent. more than it does to-day.

MR. CLIFFE: In connection with this question, we had a sample of alcohol from which we were unable to make spirit of nitre, and we concluded that was due to the presence of tannin from being stored in a barrel.

MR. HILTON: I will state that alcohol stored for any length of time in a wooden

barrel, will not produce aromatic spirit of ammonia that will conform to the requirements of the U. S. P.

MR. HALLBERG: I make a motion that a committee of one, consisting of Mr. Hilton, be appointed to make arrangements with the United States Internal Revenue Department for a new alcohol container.

THE CHAIRMAN: That does not quite cover the ground that Mr. Hilton was leading to. If you will change your motion to the effect that the Association in general meeting assembled pass a resolution requesting the Commissioner of Internal Revenue to sanction a package, I believe it would give Mr. Hilton something to work on.

MR. HALLBERG: I make such a motion.

THE CHAIRMAN: The motion is made that this Section request the Association in general session to pass a resolution requesting that the Commissioner of Internal Revenue sanction a package which will insure alcohol reaching the retail druggist in fit form for him to use. The question is before you; are there any remarks?

MR. HILTON: There were several samples of alcohol reported on sent to me, presumably U. S. P. alcohol, and I feel confident that the parties who sent it to me, were surprised after they received my report that it was not U. S. P. alcohol; so I take it from that, that evidently the parties sending it expected that it would conform to all the requirements of the Pharmacopœia.

MR. MURRAY: This discussion has been a surprise to me; there is no difficulty in our getting alcohol in tins.

THE CHAIRMAN: It is not put in tins originally, at the stills.

MR. MURRAY: About three years ago there was a notice in the Journal to the effect that you could buy alcohol warehoused in tins, obtained directly from the stills.

THE CHAIRMAN: If it is taken from the barrel and put in tins holding five or ten gallons, it must bear a United States revenue stamp.

MR. MURRAY: I am advised by the manufacturers that it is originally warehoused in tins, but I may be mistaken.

MR. HILTON: I understood indirectly, but am not in a position to state positively, that the maker of the alcohol of which I report the first four examinations, has been allowed to store his alcohol in copper containers, as a distiller's package, and in putting the alcohol up for commerce it is then placed in 10 gal. tinned iron cans. I have not only examined four lots of that alcohol, but I have examined about ten lots, and every one of them comes up to the requirements of the Pharmacopœia, and I can distinctly call to mind two lots that are a great deal better than either one of the four I reported on. Possibly some gentleman located in Boston, or in the New England States, might enlighten us on the subject. The firm from which I procured that alcohol (and I have been using it for two years), is located in Boston. I felt that I could not in justice mention the firm's name, but I thought possibly some of the members present would recognize whom I referred to, and they might be able to state something in regard to it, without mentioning the name. There is a very serious objection to storing or shipping alcohol in any metal container that is galvanized. The Bureau of Chemistry of the Department of Agriculture stored some of the best grades of distilled alcohol that they could get, in containers of that kind; after the alcohol had been stored in those containers for a few weeks they found there was a decided action on the alcohol, due prob-

ably to some galvanic action between the two metals, so that the alcohol stored was contaminated with quite a number of secondary products, which rendered it unfit, of course, for analytical purposes.

MR. PATCH: It is barely possible that Mr. Hilton expected I would say something about that Boston alcohol. I understand that the Government has purchased from a Boston house a very superior alcohol, that meets all their requirements; it is obtained from the distillation of grain, and I understand it is shipped soon after it is distilled, and it has not had time for any such change. I will say that I have purchased quantities of this alcohol, from the same distiller, and it answers—and more than answers—all that the Pharmacopœia requires.

MR. HILTON: I am very glad I have some one to corroborate the statements I made in regard to this particular brand of alcohol.

THE CHAIRMAN: The question is whether the Department permits at this time the storing and sending out of alcohol in glass containers. If it does, our resolution would be superfluous and unwise.

MR. FLEMER: I obtained alcohol from Boston in the same way, in 10 gallon tin cans, and if that is permissible I do not see why we should recommend any different container, provided the alcohol shipped that way is all right, and I presume it is.

THE CHAIRMAN: It is not quite; if that alcohol was warehoused in wood, and then put in 10 gallon tin cans, the cans must be stamped, so the presence of a stamp on the can is no indication that it has not been in wood. You would naturally pay a higher price for an alcohol that is transpacked, than you would for an alcohol run directly into a metal or glass container, and if you can get the alcohol run directly into a metal or glass container, for the same price, that you would pay for the other, it is an advantage; but we don't want to pass a resolution here asking for something to be done, which is already being done.

MR. FLEMER: There is no difficulty in obtaining alcohol in box tins, conforming to the U. S. P., and what more we want I do not know.

THE CHAIRMAN: But we want that alcohol at the same price we are paying for that now in wood containers.

MR. FLEMER: It is the same price.

THE CHAIRMAN: The motion then, as amended, is that the regulation approved would be that alcohol for medicinal purposes should be stored in tin, iron or glass containers, and not in wood.

Carried.

On motion, the Section here adjourned till to-morrow (Friday) morning, May 6th, 1910, at 10 o'clock.

ADJOURNED SESSION—FRIDAY MORNING, MAY 6, 1910.

The Section met pursuant to adjournment, at 10 o'clock, a. m., Chairman Wilbert presiding.

THE CHAIRMAN: The first paper on the program this morning is by Mr. Dunning.

He has mislaid his paper, and is now searching for it, so if Mr. Murray does not mind we will have his paper first—"The Use of Electricity in Pharmacopœial Testing."

MR. MURRAY: I have a good deal of hesitation in attempting to say anything about electricity. I do not pose as an electrician; in fact I don't know anything about it, but for a number of years I have made a little use of it, just as a man wears clothes, without knowing how to make them. I think the subject of testing by electricity is growing, and becoming important, and possibly a reference to it here at this meeting might do some good. In all my experience with electricity I have been very much pleased with the results, but whenever I have spoken to others about it they have all been sort of mystified, as if something about it could not be understood; and it was for that reason I have brought a few small pieces, to show that the work is not so complicated. In this paper I describe the testing of just one article, so as to make it less complicated.

THE USE OF ELECTRICITY IN PHARMACOPŒIAL TESTING.

BY B. L. MURRAY.

Not very much is to be found in current pharmaceutical literature bearing upon the use of electricity for purposes of pharmacopœial testing. Our Pharmacopœia makes no use of electric methods. Our National Formulary, our Dispensatories and practically all of our numerous textbooks used for the instruction of pharmaceutical students contain no references to the use of such methods for testing U. S. P. articles. There appears evidently to be a real lack of what may be termed popular knowledge of the subject among pharmaceutical chemists. This condition is aggravated too by an apparent air of mystery surrounding the subject. As soon as one hears the magic words volt, ampere, rheostat, etc., figuratively speaking the hands are thrown up and we are all at sea. Such a condition of affairs is unfortunate, for be assured electricity is a good and faithful servant, and may be put to use in very many analyses, and indeed in some analyses, where other means fail. Electricity has proved very useful and reliable in the analysis of the chemicals of the Pharmacopœia, not to mention its applicability to the larger number of chemicals used in medicine but not included in the Pharmacopœia.

For those here to-day that may be interested let us describe the analysis of just one article selected from the Pharmacopœia, and exhibit some pieces of apparatus that may be used in miscellaneous work of analysis by electro-methods. The article selected is gold and sodium chloride, and the analysis is made to determine the amount of gold in it.

The assay of Gold and Sodium Chloride for percentage of gold by the hydrogen peroxide method of the U. S. P. VIII being unsatisfactory, it has been found necessary to employ other methods. The peroxide method generally yields low results, but it can be made to work with fair accuracy by repeatedly treating the filtrate from the precipitated gold with fresh quantities of hydrogen peroxide. Even at its best, however, it is not a method to be recommended for use by miscellaneous workers. The method of the U. S. P. VII, reducing the gold by means of oxalic acid, gave

fairly good results, but difficulty was often encountered in filtering out the gold, owing to its extremely fine state of division. Both methods are antiquated, and the method of reduction of the gold by means of formaldehyde in alkaline solution is also thus regarded by some. The latter formaldehyde method is at times unreliable, the gold not fully precipitating. This incomplete precipitation may possibly be due in part to the neutralization of the added alkali by the acid formed in the course of the reaction, and on this account care may well be exercised to keep the alkali in considerable excess. But this method at its best gives unsatisfactory results in the hands of different chemists.

Speaking generally, the electrolytic determination of gold is the modern way. It is unquestionably the accurate method, as well as the elegant method. It is easy and simple to carry out, requiring little if any apparatus not to be found in well-equipped laboratories. No really expensive, unusual pieces of apparatus are required as popularly believed of electroanalysis. (Consult Smith's *Electrochemistry* for simple forms of apparatus for electroanalysis.)

In general electroanalysis work gold is probably most often deposited from the double cyanide of potassium and gold in the presence of an excess of the cyanide of potassium. The conditions for the precipitation of the gold upon the negative pole are often about as follows: $ND_{100} = 0.38$ ampere, 2.7–3.8 volts, temperature 55°C. , time required for gold to precipitate 1.5 hrs., gold present about 0.115 Gm. in 150 Cc. of water containing 1.5 Gm. of potassium cyanide. All the gold in simple gold chloride itself is easily and satisfactorily deposited by the electric current on the cathode by observing these conditions, and it is only necessary to wash and dry it before weighing it. This refers to gold chlorides carrying about forty-five to fifty per cent. of gold and the corresponding quantity of hydrochloric acid.

This operation, gold assay by electrolysis, takes little of the chemist's time and is accurate. To use the older methods in this case (simple gold chloride) especially those methods involving the addition of other metals that have subsequently to be washed out of the precipitated gold on filter paper, is almost inexcusable. Such a method would be the formaldehyde-caustic potash method. The washing of gold deposited by electricity on a platinum surface is very easy.

But as experience shows, this method of determining gold in gold chloride by the use of potassium cyanide and electricity does not work satisfactorily on gold and sodium chloride, which is the U. S. P. article before us. Not all the gold will deposit under any conditions at present known. In preparations of gold and sodium chloride containing thirty per cent. of gold only about twenty-eight to twenty-nine per cent. will deposit, after which the deposited gold discolors and the electrolyte does likewise. The reasons for this failure to entirely deposit are not clear and no modification

tion of the conditions of the electrolysis has yet been affected which will cause the remainder of the gold to come down upon the electrode easily and in good condition. It is known, however, that it is the sodium chloride which interferes. This has been demonstrated by direct experiments.

The preferable way, therefore, to determine gold in gold and sodium chloride is to determine it electrolytically in the presence of sodium sulphide. The conditions of this operation are: About 0.15 Gm. of gold and 3.5 Gm. of sodium sulphide in 125 Cc. of water, $ND_{100} = 0.2$ ampere, 0.75–1.5 volts, temperature 55–60° C. The time required for the gold to deposit is 1.5 hrs. The results are excellent. Smith in his book entitled *Electro-Analysis*, says that by using a rotating anode the gold may be completely brought down in from seven to twelve minutes and by employing both the rotating anode and mercury cathode this may even be accomplished in five minutes.

There is nothing especially new about this method. It is mentioned here mainly for the purpose of recommending it. It is a reliable method. And in nearly all of the electrolytic assays that may be made upon pharmacopœial articles there is nothing new, except the application of them to the articles of the Pharmacopœia. We are lacking many methods of assay of chemicals in our Pharmacopœia and here is a wealth of carefully proved electrolytic-methods before us, yet untouched by us. It is a serious matter to pass by a field so promising and deprive ourselves of its assistance. To mention a few assays in which electricity is excellent one only needs to enumerate the mercurial compounds, including the quick and accurate determination of the mercury in calomel and in corrosive sublimate. And in the determination of iodine and chlorine in thymol iodide excellent results have been obtained.

THE CHAIRMAN: We will now pass to the next paper, "On the Importance of Giving the Diagnostic Microscopical Characteristics of Vegetable Drugs included in the U. S. Pharmacopœia." Professor Schneider is not here, so we will read that paper by title, and proceed to the next one, on the subject of "U. S. P. Melting Point Requirements." This is largely a technical paper reviewing the melting-points in the different Pharmacopœias. Dr. Menge has for some months past been working on the question, and has tried out a number of methods, and offers here the description of a method which he recommends to be used. As Dr. Menge is not a member of this Association, it will require a motion on the part of some one to accept the paper.

MR. STANILAUS: I make the motion that the paper be received, and published in the Proceedings of the Association.

Motion duly seconded and carried.

THE CHAIRMAN: We will now listen to Mr. Dunning's paper, on the subject, "U. S. P. Tests as Reviewed by a Retail Pharmacist."

U. S. P. TESTS AS REVIEWED BY A RETAIL PHARMACIST.

BY H. A. B. DUNNING.

There are I believe, some druggists who assay some of the vegetable drugs for which assay processes are given in the United States Pharmacopœia and perhaps test a larger percentage of the chemical compounds—at least test them in part, for I believe that but a small number make a complete examination to the extent of estimating the percentage strength of such compounds as sodium salicylate, potassium and sodium tartrate and I doubt, potassium bromide or iodide and many others.

They are, perhaps, some who make a complete assay or test for a few of the U. S. P. drugs and chemicals, but the large majority rarely if ever make use of these processes.

Several very good reasons account for this condition of affairs, and perhaps one or two reasons not so good. To speak of the latter first, there are no doubt some druggists who are so filled with lassitude—we find this kind of person in every walk of life—that they would not avail themselves of the opportunity to assay their drugs, no matter how good the reason or opportunity for doing so. There are unfortunately a few who could not, who for some reason do not seem to be able to grasp the principle of these processes, and if they could, would not be able to exercise that degree of accuracy necessary for such work; but I honestly believe and know that there are a great number of men in the drug business who do not use these methods of assay, not because they do not thoroughly comprehend them nor because they are unwillingly to devote the time to this necessary work, but because they cannot afford to give the time to it, and moreover in some instances the cost of material used in the assay is prohibitive. An illustration may be offered, extract of opium.

The cost of standardizing an ounce of this extract is but little more for the manufacturing chemist than that of standardizing a hundred or thousand pounds of the drug, and the same statement applies in a greater or less degree to all drugs and chemicals.

This is the reason as many pharmacists know that the requirements of the Pure Food and Drug Laws, the Pharmacopœia being one of the official standards for same, will result in forcing, in the present condition of the retail drug business, the pharmacist to purchase most drugs requiring standardization from the manufacturing drug concerns including preparations of assayable drugs as tincture of aconite, belladonna, tincture of opium, etc., unless as some will perhaps do, the preparation is prepared from an assayed drug, the final product not being subsequently standardized, thereby risking imperfect extraction of the drug.

I feel certain that the conclusions I have reached in regard to standardized products being largely relegated to the manufacturing pharmacist and, I must confess, that it seems to me both logical and inevitable for obvious reasons.

Regarding my personal opinion as a pharmacist of the U. S. P. tests and assay processes, I believe it agrees in the main with that of most other pharmacists who have given some thought and study to them, or have made use of them.

Personally, I am very proud of the Pharmacopœia as a whole, yet as with everything devised by the human mind it is of course not perfect.

Generally speaking, the tests are not only of high scientific character but are practicable and are within the working knowledge of the educated pharmacist. While some of the tests are tedious, for instance the modified Gutzeit's test, to insure necessary accuracy they need to be. It might perhaps be well to direct the test to be made for arsenic without previous examination of the chemicals used in testing and in the event of a positive reaction the chemicals used should then be examined.

Methods of determining the iodine and saponification numbers, are, I am inclined to believe, more startling because of the unusual character of these methods than any difficulty in carrying them out practically.

This leads me to suggest that perhaps at times less delicate tests, if less tedious might be applied as preliminary measures; the more delicate tests being applied, subsequently, if necessary.

In regard to the polariscope I believe, to the large majority of pharmacists, it would prove of little value because the occasion for its use would be rare for the same reasons given, in regard to other methods of testing. However, with some study and experience I have no doubt that by many pharmacists the instrument could be used understandingly and with accuracy.

The assay of the volatile oils probably taxes the skill of pharmacists to a greater degree than most other methods of standardization and is a process which they would be last inclined to use. Volatile oils as a rule are substances of no great stability of character and used in exceeding small quantities. The druggist will in rare instances only be justified in assaying or testing them, from a financial view-point. However as is true of other assayable products the druggist is glad to feel that, the Pharmacopœia furnishes a proper standard for drugs and chemicals if not for his guidance, then for the man who is his source of supply.

In connection with this discussion I will call attention to several inconsistencies in the tests which were either observed by Dr. Daniel Base, Dr. James Black or by myself.

There seems to me no good reason why dilute hydriodic acid should be estimated by the sulphocyanate method while for dilute hydrobromic acid the "chromate" method is directed.

Different methods are directed for determining the percentage strength and limit of the other halogen salts in the assay process for ammonium iodide and sodium iodide.

While for strontium bromide "chromate" indicator is directed, for the iodide, ferric ammonium sulphate is used.

Copper sulphate test, under calcium or sodium hypophosphite should direct that the solution be acidified.

The test directing the heating of yellow wax with sulphuric acid for the purpose of detecting paraffin or ceresin should either be eliminated or modified. Twenty per cent. paraffin can scarcely be detected by the test, for the carbonized wax holds the paraffin and prevents its separation. However, if black residue, after heating with sulphuric acid, be washed and dried and extracted with chloroform or some other suitable solvent then on evaporation paraffin or cersin will be obtained.

The test for cane sugar in sugar of milk, by sprinkling some of the specimen on sulphuric acid is not at all delicate. A much better test is as follows :

Put about one grain of sugar of milk in a small porcelain dish and add ten to twenty drops of a solution containing resorcin and hydrochloric acid in 90 per cent. alcohol, tilt the dish, hold in a Bunsen flame and again tilt the dish so that the solution is no longer in contact with the heated part of the dish : a beautiful vermilion blush will appear in the presence of a small percentage of cane sugar.

THE CHAIRMAN : We have another paper along practically the same line, by members of a special committee of the Scientific Section of the Philadelphia Branch of the American Pharmaceutical Association—a real live body with a long name. This Section has done considerable work along the line of chemical assays of the U. S. P., and Dr. Rosengarten will read the report.

Mr. Rosengarten here presented the report.

THE CHEMICAL ASSAYS OF THE U. S. P. VIII.

BY W. GRAHAM, D. W. HORN AND GEO. D. ROSENGARTEN.

At the meeting of the Scientific Branch of the Philadelphia Section of the American Pharmaceutical Association on Friday, February 10th, of this year, a committee was appointed to consider the chemical assays of the U. S. P. VIII.

The committee has reviewed the methods from the points of view of the manufacturing chemist and the analytical chemist. The manufacturing chemist is deeply concerned in the assays because the U. S. P. is the legal standard to which his products must conform. The analytical chemist is concerned, since he is called upon to determine whether or not the products of the manufacturer meet all the requirements of this standard.

It will be readily appreciated because of the responsibility the manufacturer assumes for his products, that efficient analytical laboratories must be maintained by him, and in consequence skilled analysts are required to complete such an equipment. Therefore, as far as methods of analyses are concerned, those interests preponderate which pertain to laboratories fitted especially for analytical work.

The committee has reviewed in detail every assay of chemicals in the U. S. P. VIII., and has endeavored to give their conclusion, as constructive criticism, in the following lines.

The U. S. P. VIII. in general directs that a definite quantity of liquids, for example, 10 Gm. acetic acid be weighed for analysis. This we regard as impracticable and not in accord with the practice of analysts. The extreme difficulty of weighing off exactly a stated weight of any substance is very much increased in the case of liquids as a result of their vapor pressures. In all cases the time consumed in an endeavor to obtain an exact weight is, in our opinion, entirely out of proportion to any advantages to be gained in so doing. In fact, the time consumed in weighing off 10 Gm. of acetic acid exactly is more than should be required for the entire assay. Such a method of procedure would rarely be entertained in general practice, for its requirements are unreasonable and unnecessary.

Further, in directing this method of procedure, the U. S. P. VIII. is not consistent. Elsewhere it clearly recognizes the advantages of the more rational method, and directs the use of the same. Thus, under acid acetic glacial the directions are :

"Introduce into a stoppered weighing bottle 3 Cc. glacial acetic acid, and weigh accurately."

The reasons for the use of this method in cases of strong mineral acids, are of course eminently obvious, and we cannot conceive any objection to its adoption for the assay of all pharmacopœial liquids.

The same general principle should also be applied in the assay of pharmacopœial solids. This has been recognized in the directions given for the assays of potassium hydroxide and sodium hydroxide. But in the cases of some other very deliquescent solids, the U. S. P. VIII. directs the method of procedure to which we have raised the above objections. These objections are just as well founded for solids as for liquids. In the assay of strontium iodide the directions are to weigh off 0.5 Gm. of this salt and it can be easily recognized that under atmospheric conditions which frequently prevail, it is practically impossible to weigh satisfactorily and accurately an exact quantity of the chemical in question. We would urge in the interest of accuracy and economy of time the adoption of the general method of procedure for assay as given under the strong mineral acids and alkali hydroxides. If adopted, it would also introduce a greater consistency in pharmacopœial assays, a result which would be highly desirable.

The work of recalculation necessitated by such a change as we advocate, though great, need not be considered a serious obstacle, for the international atomic weights will undoubtedly be adopted, and recalculation will be necessary in any event.

Since the U. S. P. is now a legal standard, we believe that in revising the methods already given, the most modern and exact methods should

be selected rather than those whose chief advantage is simplicity. The method selected should not be the one best adapted to the analyst, or to his equipment, but the best of all known methods for its particular analytical purposes. It would indeed be satisfactory if this requirement were met by all the volumetric methods of the U. S. P. VIII., but in those instances where this is not the case, the best methods available should be selected to replace those which are used at present.

Wherever the purity rubric is given, and where no method of assay appears in the U. S. P. VIII., the selection of a suitable method is urgently demanded. As we have already endeavored to emphasize and we believe we cannot urge it too strongly, these selections should be made from the point of view of analytical efficiency.

Volumetric methods are said to be more rapid and more simple than other methods. This, however, is only true where a considerable number of assays must be made at frequent intervals;—where a single assay must be made, and that only occasionally, these advantages are often lost on account of the deterioration of the volumetric solutions. Some other form of assay may involve less manipulation and require less time than would be used in getting the solutions ready, and standardized, for the corresponding volumetric assay.

In the preparation of samples for assay, in every case the Pharmacopœia should specify definite conditions under which the sample must be prepared for weighing. This is, undoubtedly, more important in the cases of salts containing water of crystallization, but the surface properties of the various chemicals differ so widely, that the statement of definite conditions seems available in all cases.

It seems to us inconsistent to standardize a potassium hydroxide solution, using phenolphthalein as an indicator in the standardization, and employ this volumetric solution later in assays where methyl orange is recommended. Since methyl orange acts more satisfactorily in passing from alkaline to acid, and phenolphthalein more satisfactorily in passing from acid to alkaline, an error must be expected amounting to not less than 1.5 Cc. $\frac{N}{100}$ solutions, under the most favorable conditions when the same solution is used with the two different indicators. Ref. Trommsdorff's Table, Cohn's "Indicators and Test Papers."

Because methyl orange is used directly in cold solutions, and is not sensitive to carbonic acid, boracic acid and silicic acid, we would urge its use when possible, as preferable to phenolphthalein or litmus. As an example of its ready application sodium borate could be assayed directly by solution in an excess of acid, followed by back titration, using methyl orange indicator.

Potassium bitartrate as the basis for alkalimetry and acidimetry is now generally being replaced for good reasons by sodium oxalate, potassium tetroxalate, oxalic acid or constant boiling hydrochloric acid. (See Hulett J., American Chemical Society.)

We believe an endeavor to reduce the number of methods used would be desirable in all cases, where accuracy would not be diminished. It would also be very desirable that all salts of one and the same class, should, if possible, be assayed by one and the same method—for example, potassium iodide is assayed by Mohr's method, and strontium iodide by Volhard's—while under ammonium iodide no assay is given, whereas all these salts might just as well be assayed by one method. This remark also applies to the assay of salts of organic acids, as in the instance of lithium and strontium salicylate. Lithium salicylate being assayed by the use of anhydrous ammonium sulphate, while the strontium salt is determined by the use of sulphuric acid. We would recommend, therefore, that a uniform method be adopted for the assay of such organic salts where, upon ignition, there is no possibility of reduction to the metallic state.

In conclusion we beg to state that the remarks concerning these various points are made only for the purpose of rendering possible assistance in the approaching task, and for eliminating variations, making all methods of chemical assay efficient, and reducing the factor of personal equation to a minimum, so that there may be brought about as perfect a condition as possible, in order that concordant results may be attained.

THE CHAIRMAN: Gentlemen, the two communications are now before you.

MR. VANDERKLEED: It seems to me that the recommendations of this committee, as read by Dr. Rosengarten, are peculiarly pertinent at this time; for this particular reason; that those who are constantly testing substances, as to their conformity to U. S. P. requirements, actually do make use of these suggestions mentioned by Dr. Rosengarten. For example, in standardizing solutions it is absolutely necessary to standardize your solution with the aid of the same indicator that is to be used later in the determination. If you do not, you will get varying results. Now if it is true that there are those who by long experience have learned those facts, why not make those things clear in the Pharmacopœia, so that those who have not had so much experience, and who use the Pharmacopœia as a guide, will not be misled, but be properly led along the right lines?

MR. PUCKNER: A considerable portion of the remarks of Dr. Rosengarten merely show that in the last revision of the Pharmacopœia, there was a great deal of inconsistency. If the lightning strikes any of those present here, and they be put on the Revision Committee, I hope they will bear that in mind, that most of the criticisms of the Pharmacopœia are merely of lack of consistency. It is not that the Revision Committee did not know any better. Every now and then it creeps out that they did know better—that they applied the proper procedure in one case, and then forgot it; or, rather, one committee, or one member, formulated the proper procedure, and it was not carried out. If you will analyze the criticisms that have been made of the Pharmacopœia, I think nearly fifty per cent. of them can be ascribed to lack of proper editorial work; that is, of allowing things to creep in here and there, where a proper review of the whole book would have prevented; and I hope that the future members of the Revision Committee will take this to heart, and bear it in mind, that that is one of the chief things that will have to be considered, that the book must be consistent.

MR. LYONS: I will say that we on the Revision Committee, are very sensible of these imperfections, and that it is certain that another committee will endeavor especially to overcome the great difficulty that results from a committee of twenty-five endeavoring to edit one work. That is really the cause of many of these inconsistencies. After the work is two-thirds finished, some new important modification of a very simple process is introduced, and appears only in one or two or three places in the book, and has not been generally introduced. It is certain that in the new revision there will be more consistency.

MR. REMINGTON: I am more than willing to bear my proportion of the responsibilities of the Pharmacopœia inconsistencies. It may not be amiss to point out how one of the grossest inconsistencies mentioned this morning, came about. It is a bit of inside history, which I think I may give away at this time. It was at the Atlantic City meeting that Dr. Lyons will remember I raised a protest against just the thing Dr. Rosengarten has pointed out in his paper, about weighing definite quantities. I protested not only because it was against the practice of chemists generally, to do such a thing, but I also protested as a teacher, and pointed out that when we came to use the new Pharmacopœia as a text-book, we would have to say not to do so and so. The protest was effective, to the extent that certain changes were made. I know there was considerable indignation at the time, so that I went for a solitary plunge, in order to give my colleagues an opportunity to vent themselves.

MR. TURNER: It seems to me that all these criticisms of the Pharmacopœia could have been made before it was published, and that some method could be adopted by which suggestions for the Pharmacopœia could be sent out, at least to those vitally interested in the methods, for criticism, before adoption. The Branches could discuss the points, and a majority of the members could very well see the inconsistencies of methods not only in testing the chemical products, but the chemical products, but the volatile oils and clinical preparations; then there would not be as many criticisms as there are now. Moreover, I believe we would have one of the best Pharmacopœias in the world. The German Pharmacopœia has adopted that system now.

MR. ELDRED: In connection with what Dr. Rosengarten said, it seems to me that it would be very well to eliminate a large number of the pro-forma solutions that are now given in the Pharmacopœia. I doubt very much if there is any laboratory that keeps those solutions made up and standardized. Many of them are introduced, and are used for very many assays, and it seems to me that instead of trying to multiply these solutions, an effort should be made to reduce the number to the lowest limit, and make those applicable to as many assays as possible, and not use a different solution for different chemicals and different assays, unless it was absolutely necessary. Then it would be a comparatively simple matter to keep all those solutions in the laboratory, and keep them standardized so that they would be ready at any time.

MR. MURRAY: As to those inconsistencies, we found out from the remarks of Dr. Lyons how a part of them arose, and I think it would be a good idea to have one member of the Committee do the editing, and the others assist in the formation of the new Pharmacopœia. The present book certainly shows a lack of editing—cross references and all such things are very unsatisfactory.

THE CHAIRMAN: I am afraid that Mr. Murray's suggestion is rather impracticable. I doubt very much indeed whether one man could do the editing for the several portions of the book; but it certainly would seem as though it were perfectly practicable to have the chairmen of the several sub-committees made responsible for their particular work, and make them the editors for the tests and descriptions in their particular line; and if

this were done, I am pretty sure that each of the chairmen of the sub-committees would see that his portion of the work was edited pretty thoroughly.

MR. TURNER: I will offer the following resolution:

"Resolved, That the Scientific Section of the American Pharmaceutical Association recommends to the Pharmacopœial Revision Committee, that in order to promote the efficiency of the Pharmacopœia, and bring it to the highest standard possible, proposed changes in the Pharmacopœia shall be submitted to the members of the American Pharmaceutical Association."

THE CHAIRMAN: I would like to call the attention of Mr. Turner to the fact that we, as the Scientific Section, are not able to pass resolutions; we can recommend it to the Association.

MR. TURNER: I will make it then that this Section suggest, or recommends to the General Association that it adopt such a resolution.

MR. KREMERS: I think Mr. Turner means the important changes.

THE CHAIRMAN: Yes; let the resolution read that all important changes be given publicity.

MR. SCHLOTTERBECK: The recommendation is a very good one, but does not provide for any way of putting these suggestions before the Association. If these things can be copyrighted I think it would be better to put them in the pharmaceutical press, where they will not only meet the attention of the members of the Association, but of all who are interested in that general line.

THE CHAIRMAN: I would suggest that the Committee on Revision have it in their power, if they so desire, to publish the matter in the form of printed bulletins, and these printed bulletins could be copyrighted, and then sent out to any one who is willing to pay a sufficient sum to cover the expense. I believe that is a perfectly feasible plan, and any man who is interested in the revision of the Pharmacopœia will pay the expense of getting the bulletins, and if he does not offer his criticisms he is partially responsible.

MR. KREMERS: So much has been said of publication and greater publicity in the last two years, that I would like to call attention to the fact that there has been at least a little publicity in the past. As far back as 1880 the committees made use of printed drafts of the Pharmacopœia, and I know from members of the committee at that time that they got a great deal of benefit from those printed drafts. The Swiss Pharmacopœia has done the same thing in recent years. As far as our own committee is concerned I would like to point out to those interested that as Chairman of the Committee on Volatile Oils I took every opportunity to collect data on the oils that were to be official for 1900. I brought them together and distributed them at my own expense, to every manufacturer of volatile oils in this country and abroad; and I will say that at that time I got a good deal of "cussing" for my publicity. There were one or two who gave me the benefit of their criticisms, and I was obliged to them for it. Some of the worst things in the Pharmacopœia about volatile oils were things demanded by so-called manufacturers. Some of them were due to bad editing, I will admit, but there were some others put in there because the manufacturers wanted them put in. They thought the Pharmacopœia was a very inoffensive book at that time; that it did not do any harm, and suited a certain demand.

THE CHAIRMAN: The question Mr. Schlotterbeck brings up would be covered by the provision that the Chairman of the Revision Committee be empowered to solicit criti-

cisms from these manufacturers; but all the general changes should be brought to the attention of the people interested, and every one given an opportunity to point out the shortcomings, and then make the chairman of the individual sub-committee responsible for adopting, or not adopting, the changes suggested. He must be the referee. Will the Secretary read the resolution as amended?

MR. CLARK: "Resolved, to submit to the general session of the American Pharmaceutical Association, the recommendation to the U. S. P. Revision Committee, that in order to promote the efficiency of the U. S. Pharmacopœia IX, and to bring to it the highest standard possible, the proposed important changes should be given publicity by submitting them in printed or some other form, to the members of the American Pharmaceutical Association."

The Chairman here put the motion, and it was unanimously carried.

THE CHAIRMAN: We now have a paper by Mr. J. R. Rippetoe, "Laboratory Notes on the Pharmacopœia." If Mr. Rippetoe is not here, we will read the paper by title, and pass on to the next one, which is by Professor Clark, "On the Keeping Qualities of Some Standard Volumetric Solutions."

MR. CLARK: This paper deals more particularly with statistics, and I will briefly review the principal facts regarding the work I have done on this subject. It is a continuation of the work I published last year. In that paper I gave a series of figures showing the changes in titre of some volumetric solutions which had been kept for some time and these figures apply to the same solutions. I still have these same solutions, and this paper simply shows the strength of the solutions at present, as compared with their strength a year ago.

ON THE KEEPING QUALITIES OF SOME U. S. P. VOLUMETRIC SOLUTIONS.

A. H. CLARK.

As a continuation of the work presented last year on this subject I offer the following data on the same volumetric solutions as before. In the case of the Tenth Normal Sodium Thiosulphate V. S., the work has been extended somewhat.

TENTH NORMAL SODIUM THIOSULPHATE V. S.

Solution No. 6C.

This is one of the solutions containing alkali reported on last year.

Date. June 13, 1909. March 6, 1910.

Factor. 1.0121 0.9960

Remarks.—This shows that in spite of the alkali this solution is steadily losing its titre.

From the experiments detailed last year it appeared that the decomposition of a tenth-normal solution of sodium thiosulphate was due, in a measure, to the exposure to light or air, and that the presence of alkali retarded the decomposition to some extent. On the assumption that the decomposition was due to an oxidation of the sulphur some experiments were started in which reducing agents were added to the solution, and also the experiments with alkali continued.

A solution was prepared approximately tenth normal, from "C. P. Granular" sodium thiosulphate and distilled water. This solution we will call solution No. 9.

Solution No. 10.

Method of preparation.—To 1000 Cc. of solution No. 9 was added 10 Cc. distilled water.

Method of preservation.—In a clear glass, cork-stoppered bottle.

Date. June 15, 1909. March 30, 1910.

Factor. 1.0504. 1.0373.

Remarks.—This solution showed a decided flocculent precipitate.

Solution No. 11.

Method of preparation.—Same as No. 10.

Method of preservation.—In an amber-colored bottle with cork stopper.

Date. June 15, 1909. March 6, 1910.

Factor. 1.0504 1.0352

Remarks.—Shows a decided flocculent precipitate. Titre decreased the same as No. 10. Evidently the protection from light afforded by the amber bottle was of no value.

Solution No. 12.

Method of preservation.—To 1000 Cc. of No. 9 ten Cc. fifth-normal sodium hydroxide V. S. was added.

Method of preservation.—Same as No. 10.

Date. June 15, 1909. March 6, 1910.

Factor. 1.0504 1.0417

Remarks.—No signs of decomposition in this solution.

Solution No. 13.

Method of preparation.—To 1000 Cc. of No. 9 add ten Cc. half-normal sodium hydroxide V. S.

Method of preservation.—Same as No. 10.

Date. June 15, 1909. March 6, 1910.

Factor. 1.0504 1.0373

Remarks.—No sign of decomposition in this solution.

Solution No. 14.

Method of preparation.—To 1000 Cc. No. 9, add ten Cc. normal sodium hydroxide V. S.

Method of preservation.—Same as No. 10.

Date. June 15, 1919. March 30, 1910.

Factor. 1.0504 1.0417

Remarks.—Considerable precipitate. Apparently the alkali had attacked the glass. It seems from these experiments that the addition of alkali while preventing the formation of a precipitate, did not retard the decomposition of the solution as far as its titre was concerned, as this decreased in solutions No. 12, 13 and 14, about as much as in Nos. 10 and 11.

Those solutions to which "preservatives" were added (a small quantity of thymol, resorcinol, formaldehyde, etc., to act as reducing agents) did not retain their titre any better than those with alkali or nothing present.

TENTH NORMAL POTASSIUM PERMANGANATE V. S.

Solution No. 1.

The same solution as reported on last year.

Date. June 13, 1909. March 30, 1910.

Factor. 1.0419 1.0450

Remarks.—This solution is now about two years old and is of the same titre as when first made.

TENTH NORMAL IODINE V. S.

Solution No. 2.

The same solution as reported on last year.

Date. June 13, 1909. March 30, 1910.

Factor. 0.9341 0.9305

Remarks.—The titre of this solution has not changed in sixteen months.

TENTH NORMAL BROMINE V. S.

Solution No. 5.

The same solution as reported on last year.

Date. June 13, 1909. March 30, 1910.

Factor. 1.0148 1.0188

Remarks.—This solution is now two years old and is of the same factor as when first made.

TENTH NORMAL POTASSIUM SOLPHOCYANATE V. S.

Solution No. 1.

The same solution as reported on last year.

Date. June 13, 1909. March 30, 1910.

Factor. 1.0653 1.0640

Remarks.—This solution is now nearly four years old and is of the same factor as when first made.

TENTH NORMAL SILVER NITRATE V. S.

Solution No. 2.

The same solution as reported on last year.

Date. June 13, 1909. March 30, 1910.

Factor. 1.0823 1.0800

Remarks.—This solution is now about sixteen months old and of the same factor as when first made.

University of Illinois School of Pharmacy, Chicago, Ill.

MR. ASHER: You make mention of the titre of these solutions being unchanged. I do not quite understand this as I see some difference in the figures as given by you. Will you kindly explain this?

MR. CLARK: I pointed out last year that a change of four points in the third decimal, means a difference, in titrating 25 Cc. of one solution against 25 Cc. of another of only one-tenth of a Cc. in the reading: so as I said then I consider the solution has not changed in strength if the change in factor is not more than four points in the third decimal place.

MR. BROWN: I have had some experience in making thiosulphate solution; we make up enough to last six to eight months, and I had a great deal of trouble in keeping my

thiosulphate for some time, but I found by boiling my distilled water before making up the standard solution, that the titer did not change more than four places in the third decimal, in six to eight months. I have heard it suggested that chloroform will preserve thiosulphate solution; however, I have never tried it.

MR. CLARK: I had one solution that kept for nearly three years without the slightest change. I did not know at the time how it was made, so I did not report on that.

THE CHAIRMAN: The next paper on our program was by request presented yesterday afternoon. Mr. Moerk is not here, so that his paper, "The Volumetric Calculations of the U. S. P." will be passed by title. Mr. Kremers has several communications which he desires to bring before you.

Mr. Kremers here presented the following paper, accompanying his remarks with blackboard illustrations.

REVISION OF CYMENE AND ITS OXIDATION PRODUCTS.*

From the Laboratory of Edward Kremers.

THE HIGHER OXIDATION PRODUCTS OF THYMOQUINONE.

BY NELLIE WAKEMAN.

In the phytochemical study of the monardas that has been carried on more or less continuously in this laboratory for the past fifteen years the chemist has always been baffled by certain residues. Every distillation and every recrystallization has left a residue that has defied attempts to crystallize it or to separate it in any known manner. Sometimes these residues have taken the form of a heavy oil, varying in color from red, through purple or brown to black and sometimes they have formed tarry masses. Whatever the color or the consistency of the residues, however, they have always had many properties in common, the most noticeable of which have been their behavior toward solvents and alkalies. Insoluble in water but very soluble in all other ordinary solvents, they have offered no encouragement to attempts to separate them by differences in solubility in different solvents. When touched with alkali the same deep red-purple solution has always been obtained, no matter what the alkali or the strength of the solution.

In her study of thymoquinone† and hydrothymoquinone (1908) the writer met with residues that resembled in every way those encountered in the study of the monardas. Since the greatest amounts of these resi-

* The papers thus far published are herewith recorded. Others are in preparation.

1. *Nitroso carvacrol*. Δ 1.4 Terpadicne-3 oxime-6 one. By I. W. Brandel, Ph. Rev. 22, pp. 248, 290.

2. *Nitroso thymol*. Δ 1.4 Terpadiene-3 one-6 oxime. By I. W. Brandel, Ph. Arch. 4, p. 107.

3. *Thymoquinone and hydrothymoquinone*. By Nellie Wakeman, Ph. Rev. 26, pp. 329, 364.

† Ph. Rev., 29, p. 329, 364.

dues were obtained when oxidation had been carried too far, she was led to a study of the oxidation products of thymoquinone. In the course of this study it was learned that dihydroxythymoquinone corresponded with the red crystals obtained by Mead* (1895) and later by Suzuki† (1905-06).

Therefore, when a small quantity of the same red crystals was separated from a monarda residue, it seemed that at least a beginning had been made on these hitherto seemingly hopeless mixtures.

At the time that the red crystals were first obtained in the distillation of the oil from *Monarda fistulosa* the statement was made that this was the coloring matter‡ which gave the red or brown color to some of the oils. Later, when thymoquinone and hydrothymoquinone§ were separated from the monarda oils and the quinhydrone hypothesis of plant pigmentation was formulated, it was supposed that the color of the dark oils, as well as the purple pigmentation of stem and flower was due to thymoquinhydrone. More recent studies have led us to believe that both suppositions were correct.

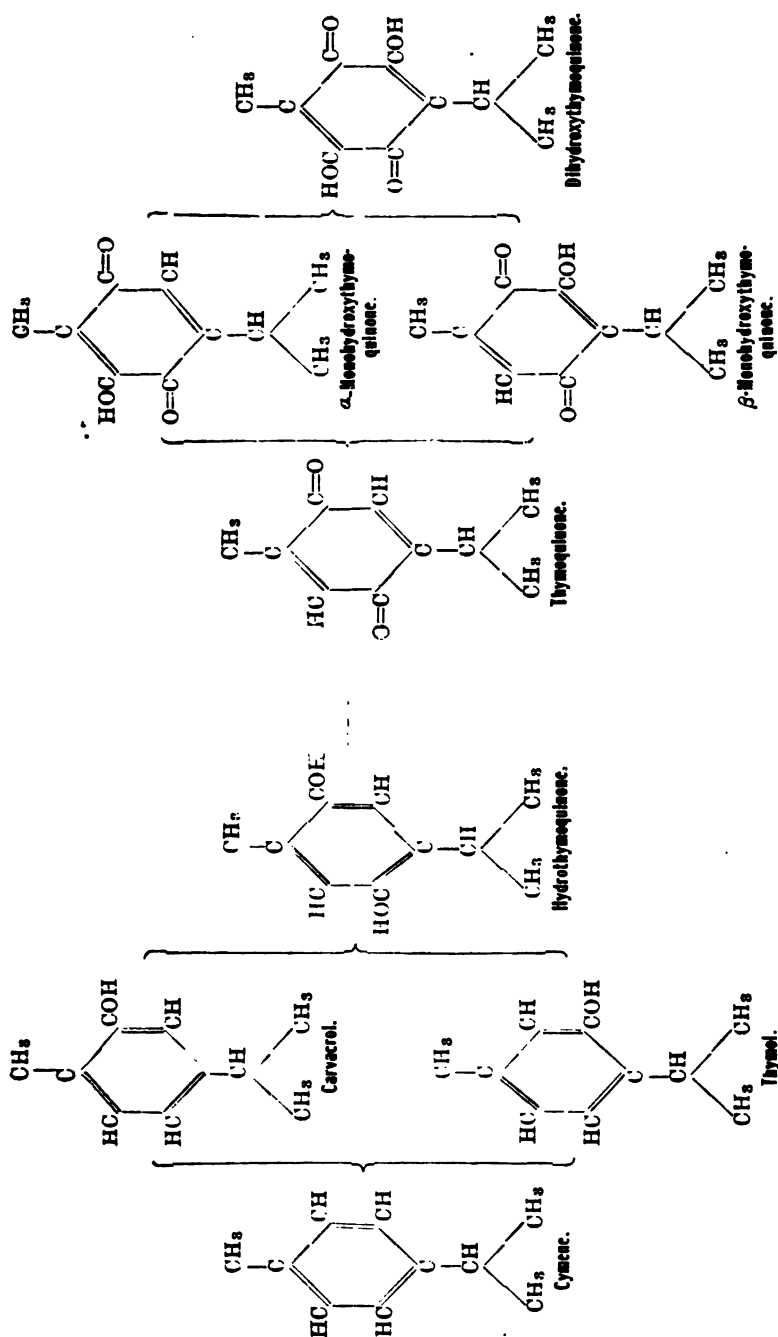
In order to appreciate the capacity of hydrothymoquinone and its oxidation products to produce pigments, one must take into consideration the structure of these compounds and their possibilities for reaction, forming not only quinhydrones but phenoquinones and polythymoquinones, with each other and with themselves. Starting with cymene, the underlying hydrocarbon, we have the following remarkable series of compounds, all but one of which have actually been isolated from the monardas. That one, rather the two isomeric oxythymoquinones, while it has never actually been isolated, has been indicated, again and again, in the alcoholic extracts from the plant, in the oils, and in the residues.

* Ph. Rund., 13, p. 207.

† Mid. Drug. Ph. Rev., 44, p. 342.

‡ Ph. Rund., 13, p. 207.

§ Ph. Rev., 19, p. 200.



Besides these simple compounds, as stated above, there are the phenoquinones, quinhydrones and polyquinones, any or all of which may be expected to occur in the oils, or at least in the residues.* To get an idea of the capacity for forming these complex compounds let us consider one of the simple compounds, the dihydroxythymoquinone. As will be seen from the foregoing chart, this compound is not only a quinone but a diatomic phenol and possesses, theoretically at least, all the possibilities for reaction possessed by both classes of compounds. As a quinone it can form quinhydrones with hydrothymoquinone and with itself. As a diatomic phenol it can form them with thymoquinone and oxythymoquinone. It can form phenoquinones with thymol, carvacrol, and with oxythymoquinone. And it can form polyquinones with thymoquinone, oxythymoquinone and with itself. When we add to these compounds those theoretically possible by combining the other compounds in the chart with each other and with themselves, we have an array of formulas that is truly formidable, not only in number but also in complexity.

With these possibilities in mind one still marvels, it is true, at the varied tints of stems, flowers, and leaves; but it is with a feeling of satisfaction and appreciation. And when one sees the color change as the relative amounts of the different substances are changed in mixtures, one realizes more than ever that the rapid changes in the colors of leaves in autumn cannot be explained as a mere breaking-down of chlorophyll.

OCCURRENCE IN PLANTS.

Dihydroxythymoquinone.—In 1895 Mead † in distilling a small quantity of phenols, separated from the oil of *Monarda fistulosa* by alkalies, obtained red crystals which sublimed in the condenser and were collected separately. The crude crystals melted at $219-223^{\circ}\text{C.}$, and gave a purple color with alkalies. Sublimed between watch glasses the scarlet-red prismatic crystals melted at $256-266^{\circ}\text{C.}$ In 1905-6 Suzuki ‡ in the same way obtained a small quantity of the same red crystals and studied their properties. He found them soluble in strong hot alcohol and in ether, sparingly soluble in hot water with a red color, soluble in aqueous alkalies with a purple color. Recrystallized from strong hot alcohol, they melted at $225-226^{\circ}\text{C.}$ Some of these crystals tested by the writer yielded with lead acetate the green precipitate characteristic of dihydroxythymoquinone, as did also these separated by Mead.

Suzuki points out the fact that residues of different colors were obtained in the various methods employed for purification, and concludes that the

* Since writing the above, dithymoquinone has been obtained in quantity in the process of rectification of thymoquinone from *Monarda fistulosa*.

† Ph. Rund., 13, p. 207.

‡ Mid. Drug. Ph. Rev., 44, p. 342.

needle-shaped crystals deposited on the inner tube of the condenser may have been a mixture of several substances. This view is probably correct. The fact that dilution of the alcoholic mother liquor with water yielded a voluminous white precipitate (like the precipitate of hydrothymoquinone from aqueous solutions) and that the pink solution obtained by boiling the impure crystals with water left a white residue, leads one to suspect the presence of hydrothymoquinone. This hydrothymoquinone presumably was combined with the dihydroxythymoquinone in the form of a quinhydrone. Another residue, insoluble in ether, was of a purple color. Suzuki's crystals, moreover, when turned over to the writer were of two kinds, one a bright cherry-red, the other dull purple-red in color. The quantities, however, were too small to be used for more than a few preliminary tests.

A short time ago it was found that crystals of dihydroxythymoquinone had spontaneously sublimed from a residue obtained from the phenol portion of a *Monarda* oil, that had been left in a large flask after distilling. These crystals had collected on the walls of the flask and on the upper surface of the tarry residue. After being removed by washing out with petroleum ether they responded to the tests for dihydroxythymoquinone. Red crystals also separated upon standing from the carvacrol obtained from *M. fistulosa*. These crystals were filtered out and found to be dihydroxythymoquinone.

Since dihydroxythymoquinone has been prepared by shaking thymoquinone with caustic alkali;* and since the phenol oil from which all this dihydroxythymoquinone has been isolated, was separated from the original oil by shaking with caustic alkali, the question arises: was the dihydroxythymoquinone actually present in the plant, or was it produced by shaking a thymoquinone-containing oil with caustic alkali? Aside from the fact that the five per cent. solution of alkali used in separating the phenols seems scarcely sufficiently strong to produce the oxidation, there is nothing to prevent our supposing such may have been the case. We have, however, indications of dihydroxythymoquinone in plants where there can be no question of its having been thus formed.

In 1832 Elsner † extracted the pigment from the corollas of *Monarda coccinea* (*M. didyma* L.) and found the dried pigment to be of a purple-red color. Tested with basic lead acetate in aqueous solution, it gave a bluish-green precipitate, one of the characteristic tests for dihydroxythymoquinone. The writer obtained this precipitate from the alcoholic extract of *Monarda didyma* corollas with both basic and normal lead acetate, and also the characteristic pale violet color with lime water. These reactions were obtained also from the aqueous solution obtained by dissolving

* See the experimental part of this paper.

† Chem. Centralbl., 3, p. 511.

the dried alcoholic extract of the pigment from both the purple stem and the red autumn leaves of *Monarda fistulosa*.

Monohydroxythymoquinone.—As stated above monohydroxythymoquinone has never been isolated from a plant or a plant product. Elsner obtained a violet-red precipitate from the aqueous solution of the dried pigment of *Monarda coccinea* (*M. didyma*) when treated with normal lead acetate. This violet-red color with lead salts has been found by the writer to be characteristic of monohydroxythymoquinone. It has been obtained repeatedly from the residues of *M. fistulosa* and *M. punctata*, also from the phenol portion of the oil from *M. citriodora*, *M. fistulosa*, and that portion of the phenol oil of *M. punctata* that did not solidify when chilled below zero.

Not only from the evidence of these tests but also from the position of the oxythymoquinones in this series of compounds does it seem reasonable to suppose that monohydroxythymoquinone is present in the *Monarda* species along with the other members of the series. The fact that it is almost impossible to prepare either thymoquinone or dihydroxythymoquinone without obtaining at least traces of the monohydroxy compound lends weight to this supposition. And when we take into consideration the unsettled state of the chemistry of the monohydroxythymoquinones, owing, no doubt, to the existence of the two isomeric forms no less than to the difficulty with which they are separated from the mixtures of thymoquinone and dihydroxythymoquinone with which they always occur, it seems in no way remarkable that, if present in the plants, they have not yet been isolated.

Δ 3,6 TERPADIENE-DIONE-2, 5, -OL 6; AND Δ 3,6 TERPADIENE-DIONE-2, 5, -OL 3.

Synonyms.—Oxythymoquinone. * Hydroxythymoquinone. † Oxythymoile. ‡

History.—Oxythymoquinone was probably first prepared by Lallemand § in 1857. In studying the effect of light upon thymoquinone, he exposed it to bright sunlight in sealed tubes and obtained a black product which, upon washing with alcohol, yielded a yellow powder while the alcoholic solution contained a mixture of thymoquinone and thymoquinhydrone. This crystalline powder, which was only a small fraction of the material employed, was also found in the products of distillation of thymoquinone from which it was separated by washing with alcohol. Lallemand describes this product as insoluble in water and alcohol; also in alkalies and indifferent to nearly all reagents; soluble in ether; m. p. 190° C. By

* Jr. pr. Ch., III, p. 50.

† Chem. Soc. Jr., 58a, pp. 884, 965.

‡ Ann. Chim. Phys. (3), 49, p. 148.

§ Ann. Chim. Phys. (3), 49, p. 167.

elementary analysis Lallemand obtained the formula $C_{11}H_{10}O_2$ (thymoquinone $C_{11}H_{10}O_2$) ; hence concluded that it was thymoquinone that had taken on two equivalents of oxygen, and named it oxythymoile, from thymoile as he called thymoquinone. The record of this experiment is doubly interesting because it shows that one of the earliest observed properties of thymoquinone was that which we now call autoxidation, the power of reducing one molecule to oxidize another.

No further mention of oxythymoquinone is found in chemical literature till Carstanjen, * in 1871, prepared it from monobromthymoquinone and from the diamidothymol dihydrochloride. Then, in 1877, comes a long discussion between Ladenburg and Engelbrecht † Liebermann, ‡ and Carstanjen § about the melting point of the compound, its true structural formula, and the possibility of there being two isomeric forms satisfying the same empirical formula. This discussion is continued by Zinke || in 1881 and by Schulz ¶ in 1883. Finally, in 1890, Mazzara ** differentiates between two oxythymoquinones with different colors, forms of crystals and melting-points to distinguish them, calling one (α) or 6-oxythymoquinone, and the other (β) or 3-oxythymoquinone.

Methods of Formation and Preparation.

I. From monobromthymoquinone.

In 1871 Carstanjen †† prepared oxythymoquinone by dissolving monobromthymoquinone in warm potassium hydroxide solution in which it dissolves with a dark red-brown color. From this solution it was precipitated with dilute acid as a flaky yellow powder. After drying it sublimed in beautiful scarlet crystals.

II. From diamidothymol.

(a) Carstanjen, §§ in 1871, prepared oxythymoquinone from diamidothymol dihydrochloride (obtained from dinitrothymol) by distilling with platinum chloride.

(b) By distilling with ferric chloride, in 1877, Liebermann || obtained oxythymoquinone from diamidothymol, obtained from both nitrosothymol and thymol sulphonic acid through the dinitrothymol.

(c) Ladenburg ¶¶ and Englebrecht, in 1877, prepared oxythymoquinone by distilling with steam ferric chloride and diamidothymol, obtained from dinitrothymol through the ethyl ester.

(d) In 1890 Mazzara *** prepared the compound which he

* Jr. pr. Ch., 111, pp. 57, 58.

† Ber., 10, p. 1219.

‡ Ber., 10, p. 78, 79.

§ Jr. pr. Ch., 123, p. 399.

|| Ber., 14, p. 97.

¶ Ber., 16, p. 899.

** Ber., 23, p. 1392.

†† Jr. pr. Ch., 111, p. 57.

‡‡ Jr. pr. Ch., 111, p. 57.

§§ Jr. pr. Ch., 111, p. 58.

||| Ber., 10, p. 79.

¶¶ Ber., 10, p. 1219.

*** Ber., 23, p. 1390.

called (a)-6 oxythymoquinone by distilling diamidothymol dihydrochloride (obtained from dinitrothymol) with ferric chloride.

III. From dinitrochlorcymene.

(a) In 1877 Ladenburg * and Englebrecht obtained oxythymoquinone from dinitrothymol, through dinitrochlorcymene.

IV. From diamidocarvacrol.

By distilling diamidocarvacrol hydrochloride with ferric chloride, in a current of steam, Carstanjen,† in 1877, prepared oxythymoquinone.

V. From dinitrocarvacrol.

In 1890 Mazzara ‡ prepared β -oxythymoquinone by reducing dinitrocarvacrol and oxidizing with ferric chloride.

VI. From thymoquinone.

1. Zincke,§ in 1881, prepared oxythymoquinone by treating thymoquinone with methylamine and hydrolizing the resulting methylamido compound by boiling with dilute hydrochloric or sulphuric acid.

2. In 1883 Schulz || prepared oxythymoquinone by treating thymoquinone with dimethylamine, thus securing the dimethylamido compound which he hydrolized as above.

3. In 1857 Lallemand ¶ obtained oxythymoquinone by autoxidation by exposing thymoquinone to light in sealed tubes.

VII. From dioxythymoquinone.

In 1881 Zincke ** obtained oxythymoquinone by reducing dioxythymoquinone with sulphurous acid, then oxidizing with ferric chloride.

Purification. Lallemand purified oxythymoquinone by sublimation, also by recrystallizing from hot alcohol: Schulz by recrystallizing from hot water or from dilute alcohol; Mazzara by recrystallizing from hot alcohol.

Physical Properties. Form, color, melting-point.—There are many conflicting reports as to the form of crystals, color and melting-point of oxythymoquinone, probably due to a confusion of the two isomeric forms and to the fact that a mixture of oxy- and dioxy-thymoquinone has been mistaken for pure oxythymoquinone. Castanjen describes oxythymoquinone as existing in regular rhombic scarlet-red crystals, m. p. 187° C.; also as orange-yellow crystals, m. p. 165–166° C. Lieberman †† describes the crystals as orange-colored, m. p. 183–185° C.; Zincke ‡‡ as orange or brownish-yellow plates and broad needles, m. p. 174–175° C., also as yellow plates m. p. 165° C.; Schulz, §§ as small needles, yellow to yellow-brown, m. p. 166–176° C.; while Mazzara ||| says that α -oxythymoquinone exists in

* Ber., 10, p. 1221.

† Jr. pr. Ch., 123, p. 412.

‡ Ber., 23, p. 1392.

§ Ber., 14, p. 97.

|| Ber., 16, p. 899.

¶ Ann. chim. phys. (3), 49, p. 167.

** Ber., 14, p. 97.

†† Ber., 10, pp. 79, 613.

‡‡ Ber., 14, p. 97.

§§ Ber., 16, p. 901.

||| Ber., 23, p. 1392.

bright orange-yellow crystals m. p. 166–167° and β -oxythymoquinone in dark orange-colored crystals, m. p. 181–183° C.

Solubility.—All experimenters (Lallemand excepted) agree that oxythymoquinone is soluble in hot alcohol and ether, and in alkalies with a violet-red color, while Schulz adds hot water, chloroform, benzol, etc., to the list.

Chemical Properties.—Oxythymoquinone forms salts with the alkalies and with calcium and barium which are very soluble in water with violet-red color. The salts of the heavy metals are insoluble.

The following compounds are given by Beilstein : *

Ethyl ether of oxythymoquinone.

Chloroxythymoquinone.

Aminooxythymoquinone.

Anilinoxythymoquinone.

p. Toluidooxythymoquinone.

EXPERIMENTAL PART.

In addition to the above, much of which has been duplicated by the writer, the following experimental work has been accomplished :

Preparation.—In attempting to prepare the thymoquinone hydroxysulphonate of sodium, as Carstanjen had formed the corresponding potassium salt, by the use of normal sodium sulphite, instead of pale yellow crystals a heavy purplish-red solution resulted. This, upon standing for several days, changed to a thick tarry mass. The mass was dissolved in 50 per cent. sulphuric acid and distilled with steam till the distillate was no longer acid, a large amount of clear yellow acid distillate being obtained. The acid residue in the flask was of a deep wine color. From this, upon standing, orange-red crystals separated. These were collected and recrystallized from strong hot alcohol, yielding orange-yellow, small needle-shaped crystals ; m. p. 165–166° C. ; soluble in hot alcohol, ether, benzene and chloroform, also in aqueous alkalies with a pure purple color.

Chemical Properties—Tests.—The purple-red color with calcium hydroxide and barium carbonate was found to be characteristic for oxythymoquinone, being much more intense than the color reaction with the related compounds.

When treated with normal or basic lead acetate a violet-red solution, or precipitate, is formed depending upon the concentration of the solution.

Quinhydrone.—A solution of oxythymoquinone yields a red color with a solution of fuchsin decolorized by sulphurous acid, as does also a solution of hydrothymoquinone. This color reaction is not given when a solution of molecular quantities of oxythymoquinone and hydrothymoquinone is treated with the decolorized fuchsin solution, thus showing the formation of some compound, probably a quinhydrone.

Traces of a purple quinhydrone have been obtained, also, by evaporating

* Beilstein III., p. 368.

an ethereal solution of molecular quantities of the two compounds mixed. Indications of a quinhydrone formed by the union of oxythymoquinone with dioxythymoquinone have also been obtained, but not sufficiently strong to warrant an assertion of the existence of such a compound under the conditions tried.

Δ 3.6 TERPADIENE-DIONE 2, 5, -DIOL 3, 6.

Synonyms. — Dioxythymoquinone. * Bioxythymoquinone. † Dihydroxythymoquinone. ‡ Thymozarin. §

History.—The first mention of dioxythymoquinone in chemical literature appears to be that of its preparation by Carstanjen || in 1871 from dibromthymoquinone by dissolving the latter in hot potassium hydroxide solution and precipitating with dilute acid. Since then it has been prepared and studied along with oxythymoquinone, the two substances usually being formed at the same time. This fact, together with the difficulty with which they are separated, has led to much confusion, and discussion, regarding the properties of the two compounds since mixtures of the two were doubtless often mistaken for pure substances.

Methods of Formation and Preparation.

I. From thymoquinone.

In 1881 Zincke ¶ prepared dioxythymoquinone from thymoquinone by treating with methylamine, then hydrolizing the resulting amido compound.

II. From dibromthymoquinone.

1. Carstanjen ** in 1871 obtained a small yield of dioxythymoquinone by dissolving dibromthymoquinone, moistened with alcohol, in hot potassium hydroxide solution and precipitating with dilute acid.

2. Zincke †† in 1881 obtained dioxythymoquinone by treating dibromthymoquinone with methylamine and hydrolizing with sulphuric acid or hydrochloric acid.

III. From oxythymoquinone.

1. In 1877 Ladenburg ‡‡ and Engelbrecht prepared dioxythymoquinone by boiling oxythymoquinone in potassium hydroxide and precipitating with hydrochloric acid, then crystallizing from hot alcohol.

IV. From chloroxythymoquinone.

1. Ladenburg §§ and Engelbrecht in 1877 prepared dioxythymoquinone from chloroxythymoquinone by boiling with potassium hydroxide, precipitating with hydrochloric acid and crystallizing from hot alcohol.

V. From dinitrothymol.

Ladenburg ||| and Engelbrecht by oxidizing the reduction prod-

* Jr. pr. Ch., 111, p. 62.

† Ber., 10, p. 1222.

‡ Chem. Soc. Jr., 94, A1, p. 660.

§ Ber., 10, p. 1222.

|| Jr. pr. ch., 111, p. 62.

¶ Ber., 14, p. 95.

** Jr. pr. ch., 111, p. 62.

†† Ber., 14, p. 65.

‡‡ Ber., 10, p. 1222.

§§ Ber., 10, p. 1222.

||| Ber., 10, p. 1219.

ucts of dinitrothymolether obtained dioxythymoquinone in an impure condition being mixed with oxythymoquinone.

Methods of Purification.—All authorities agree in purifying dioxythymoquinone by crystallizing from hot alcohol. Zincke * and Ladenburg † say that it sublimes unchanged at temperatures above the melting-point, while Carstanjen ‡ states that when one attempts to sublime it, it chars and only a very small fraction of the original substance is obtained in crystals.

Physical Properties.—Zincke describes dioxythymoquinone as existing in bright red prisms and needles; m. p. 213° C. Ladenburg and Engelbrecht say cherry-red glistening needles, m. p. 230° C.

It is soluble in hot alcohol, difficultly soluble in hot water, soluble in alkalies with a violet color.

Chemical Properties.—When treated with § sulphurous acid at $120-130^{\circ}$ C., it is reduced to probably either oxy- or dioxy-hydrothymoquinone, i. e., trihydroxy or tetrahydroxy cymene, which when oxidized with ferric chloride yields oxythymoquinone.

Carstanjen || by heating dioxythymoquinone with ferric chloride obtained bright yellow sparkling crystals (Krystallflitter) which he looked upon as $C_{16}H_{16}O_4$ and called thymodichinon.

Dioxythymoquinone ¶ forms the following salt-like compounds :

Barium compound.—Dark violet or dark green needles and plates, very soluble in water.

Lead compound.—Green precipitate.

Diacetate.—Yellow needles, m. p. 81° C.

Dibenzoate.—Yellowish, thick prisms or needles—m. p. 163° C.

By boiling dihydroxythymoquinone with an excess of potassium hydroxide solution Fichte ** obtained ethyl isopropyl succinic acid.

DIHYDROXYTHYMOQUINONE (EXPERIMENTAL PART).

Methods of Preparation.

I. From dibromthymoquinone.

Dihydroxythymoquinone was prepared according to Carstanjen by moistening dibromthymoquinone with alcohol, then heating with potassium hydroxide. The dark red-brown solution was precipitated with dilute sulphuric acid, the precipitate washed with hot water, then crystallized from hot alcohol. Some red crystals separated out, which melted at 210° C.; when again crystallized from hot alcohol they melted at 216° C. The yield was very small—not more than 2 or 3 per cent., a large amount of black resinous matter being obtained.

II. From thymoquinone and potassium hydroxide.

Five grams of thymoquinone were dissolved, with shaking, in 50 Cc. of a 20 per cent. potassium hydroxide solution and heated on a water-bath for one hour, with occasional shaking; then distilled with

* Ber., 14, p. 95.

† Ber., 10, p. 1222.

‡ Jr. pr. ch., p. 62.

§ Ber., 14, p. 97.

|| Jr. pr. Ch., III, p. 62.

¶ Beilstein, III, p. 368.

** Ann., 361, pp. 376, 397.

steam. A clear yellow distillate with a strong acid odor was obtained. On cooling some red crystals separated, while others condensed in the tube. The crystals from the condenser were bright red, m. p. 220°C . Those separated from the distillate were orange-red and melted at $253\text{--}255^{\circ}\text{C}$. After recrystallizing from hot alcohol, m. p. 217°C . The two portions were then recrystallized together, m. p. $220\text{--}223^{\circ}\text{C}$. Again recrystallized, m. p. $225\text{--}226^{\circ}\text{C}$. Better results were obtained by this method than by the preceding one.

Purification.—By crystallizing from hot alcohol.

PHYSICAL PROPERTIES.

Form and Color.—Bright red crystals.

Solubility.—Insoluble in cold and not easily soluble in hot alcohol (95 per cent.). Very slightly soluble in boiling water.

Melting Point.— $225^{\circ}\text{--}226^{\circ}\text{C}$. Sublimes at higher temperatures.

Chemical Properties.—It dissolves in alkalis with purple-red color. With both normal and basic lead acetate a green precipitate is produced; with lime water, a violet color.

The dihydroxythymoquinone gives a bright-red color reaction with a decolorized solution of fuchsine. This reaction is prevented when molecular quantities of hydrothymoquinone or thymoquinone are mixed with the dihydroxythymoquinone solution, showing the formation of compounds, probably quinhydrone, with these substances. The color reaction with fuchsine is also prevented to a large extent when a molecular quantity of oxythymoquinone is added.

In preparing dihydroxythymoquinone by treating thymoquinone with potassium hydroxide a large amount of clear yellow acid distillate was obtained. This acid solution, whose odor strongly suggested a fatty acid, resembled in both appearance and odor the distillate obtained when monohydroxythymoquinone was prepared by the action of sodium acid sulphite on thymoquinone. This distillate was neutralized with barium carbonate and the silver salt prepared from the crystallized barium compound. Silver determinations of the silver salt obtained from two separate distillates gave 55 and 57 per cent. of silver respectively. The silver compound, however, was very unstable and, though filtered and dried in the dark, often turned black before it could be weighed. These results, which may therefore be considered high, were thought to indicate the presence of valeric acid ($\text{Ag} = 52$ per cent.). They might, however, with equal probability, indicate the ethyl isopropyl succinic acid ($\text{Ag} = 54$ per cent.) obtained by Fichter* (1908) upon boiling dihydroxythymoquinone with potassium hydroxide solution.

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Ueber den rothen Farbestoff in den Blumenblaettern und einigen andern Pflanzentheilen.

* Ann., 361, pp. 376, 397.

Chem. Centralbl., 3, p. 511.

The dried pigment of *M. coccinea* is a beautiful purple-red and gives, in aqueous solution, a bluish-green precipitate with basic lead acetate, a violet-red precipitate with lead acetate.

Lallemand, A. 1857.

Études sur l'essence de thym.

Ann. Chim. Phys. (3), 49, p. 148.

A study of thymol, thymolsulphonic acid, "acide sulfaceto thymique," dinitrothymol, trinitrothymol, sodium thymolate, thymene, trichlorthymol, pentachlorthymol, thymoquinone (p. 163), hydrothymoquinone (p. 164), thymoquinone amide "acide thymollique," hydroxythymoquinone (page 167).

Carstanjen, E. 1871.

Ueber chinonartige Abkömmlinge des Thymol.

Jr. pr. Ch., 111, p. 50.

A review of the earlier work of Lallemand resulting in a correction of the empirical formulas of hydrothymoquinone and thymoquinone, also a discussion of the brom compounds of thymoquinone and of oxy- and dioxy-thymoquinone.

Carstanjen, E. 1871.

Zur Kenntniss der Chinone.

Jr. pr. Ch., 123, pp. 398-417.

Preparation of thymoquinone and of oxythymoquinone from thymol and from carvacrol. A discussion of the melting points and structural formulas of the compounds obtained from both sources.

Liebermann, C. 1877.

Zur Constitution des Oxythymochinons.

Ber., 10, pp. 77-80.

The preparation of thymoquinone and oxythymoquinone from nitrosothymol, also of oxythymoquinone from thymol sulphonic acid. Melting point and structural formula of oxythymoquinone.

Liebermann, C. 1877.

Zur Constitution des Oxythymochinons.

Ber., 10, pp. 611-614.

Gives percentage composition of various salts of binitrothymol obtained from thymolsulphonic acid and from nitrosothymol. Concludes that true melting point of oxythymoquinone is unknown.

Ladenburg, A. and Engelbrecht. 1877.

Zur Constitution des Oxythymochinons.

Ber., 10, p. 49.

Differs from Carstanjen as to melting point and from Liebermann as to constitution of the molecule.

Zincke, Th. 1881.

Ueber die Einwirkung von Aminen auf Chinone.

Ber., 14, pp. 92-95.

Preparation of oxy- and dioxy-thymoquinone from thymoquinone through the mono- and di-methyl amido compounds respectively. Their subsequent reduction with sulphurous acid and oxidation with ferric chloride to oxythymoquinone.

Preparation of dioxythymoquinone from dibromthymoquinone through the dimethyl-amido compound. Discussion of structural formula and possibility of two isomeric forms.

Schulz, H. 1883.

Ueber oxythymochinon aus der dimethyl aminverbindung des thymochinons.

Ber., 16, pp. 899-901.

Oxythymoquinone prepared by treating thymoquinone with dimethylamine. *Discussion of properties.*

Massara, G. 1889.

Sulla costituzione dei derivati del carvacrol, del tiamochinone e del timol.

Gazzetta Chimica Italiana, 19, p. 337.

[Ber., 22, p. 730 c; Chem. Soc. Jr., 58 A., p. 884.]

A discussion of the structural formulas of some of the derivatives of carvacrol, thymol and thymoquinone.

Massara, G. 1890.

Ueber ein neues oxythymochinon.

Ber., 23, p. 1390.

α -Oxythymoquinone-*o*-(methyl) oxythymoquinone obtained by distilling diamidothymolchlorhydrate with ferric chloride.

β -Oxythymoquinone-*m*-(methyl) oxythymoquinone, by reduction of dinitrocarvacrol and oxidizing with ferric chloride.

Massara, G.

Sopra un nuova ossitimochinone.

Gaz., 20, pp. 475-485.

(Substantially the same article as above.)

Kowalski, M. 1892.

Ueber die einfuehrung der amidogruppe in die oxychinone mittelst hydroxylamin.

Ber., 25, p. 1661.

Oxythymoquinoneoxime obtained by treating oxythymoquinone, in alkali solution, with hydroxylamine.

Kremers, E. 1895.

The volatile oil of *Monarda fistulosa*.

Ph. Rund., 13, p. 207.

In distilling the phenol portion of the oil from *M. fistulosa*, Mead obtained red crystals melting at 219-225° C.

Susuki, S. K. 1910.

Hydrothymoquinone and Oxidation Products from *Monarda fistulosa*.

Mid. Drug. Ph. Rev., 44, p. 342.

In distilling the phenol portion of the oil from *M. fistulosa*—the red crystals were again obtained.—A study of the properties of the compound.

Fichter, Fr. 1908.

Ueber synthetische p-dialkylirte Dioxychinone.

Ann., 361, pp. 363-402.

By boiling oihydroxythymoquinone—with an excess of sodium hydroxide—the ring is broken and ethyl isopropyl succinic acid is obtained.

At the conclusion of Mr. Kremers' remarks, the program for the morning was completed; but Mr. Raubenheimer, at the invitation of the Chairman, brought to the attention of the Section a bottle containing urine which had developed a peculiar color, which he was unable to account for, and read a paper on the detection of methylene blue in urinc, which was discussed informally by Mr. Vanderkleed, Mr. Kremers, Dr. Lyons, Mr. Turner, and Mr. Shimpf, the latter citing a similar case in his experience.

METHYLENE BLUE IN URINE—ITS DETECTION.

BY OTTO RAUBENHEIMER, BROOKLYN, N. Y.

The writer, a practical retail pharmacist, who prefers to make a urine analysis to the sale of postage stamps, has during this spring encountered

some very curious specimens. Numerous samples of greenish-blue urine were brought into my laboratory by different physicians, who were at first under the impression that the color was due to indigo blue, resulting from the oxidation of indican. This surmise was strengthened by the fact that chloroform extracted the blue color and left the urine almost colorless, as in the tests for indican. However, the patients were not sick, but merely frightened on account of the greenish-blue urine. Furthermore, when the regular indican tests *i. e.* Obermayer's ($\text{HCl} + \text{FeCl}_3$) were applied, then chloroform did not extract color.

For these two reasons there was no indican present. I learned that samples of a proprietary kidney pill had been distributed which contained methylene blue or methylthionine hydrochloride, and to this chemical the color of the urine was due, although some of the patients denied having taken the pills.

Methylene blue taken internally will color the urine green or greenish-blue, or even intensely blue, if taken in large doses. I might also state here that the dye "methyl-blue," the sodium salt of triphenylpararosanilinetrisulphonic acid will not color the urine, a point well to remember for physicians as well as pharmacists.

For my own satisfaction I made some pharmacological experiments on myself. I found that the internal administration of one and even one-half grain of methylene blue will color the urine intensely green after three hours. The morning's urine, after remaining in the system over night, is very dark blue or greenish-blue, has even a blue foam upon shaking, and upon cooling deposits some of the blue on the sides of the bottle. The color of the urine gradually decreased, but with one grain of methylene blue it lasted 48 hours, and with one-half grain about 24 hours. Samples of the different urines, properly marked, were used for experiments, and upon being set aside developed a very strange phenomenon which will be referred to later.

Although the pharmaceutical and chemical laboratory of the writer is an extensive one, I find that books on urine analysis merely state that the blue color of urine might be due to methylene blue, but neglect to give any distinctive tests for the same. I was therefore compelled to work out tests of my own which might be of interest to members of the Scientific Section of the A. Ph. A.

Indigo blue or indigotin, the hydrolization product of the glucoside indican, is soluble in chloroform, amyl alcohol and nitrobenzene. Methylene blue is also soluble in these three chemicals, and I find that in extracting it from urine the chloroform is colored blue, amyl alcohol bluish-green, and nitrobenzene green. *The next edition of the U. S. P. might mention the solubility of methylene blue in chloroform.*

While indigotin is also soluble in carbon tetrachloride, an old friend of mine, and which therefore can be used in place of chloroform in the in-

dican tests, I found out that methylene blue is insoluble in CCl_4 , which fact can therefore be utilized as a differential test in urine analysis, etc. *The next edition of the U. S. P. might perhaps also mention the insolubility of methylene blue in carbon tetrachloride (difference from indigotin).*

Other destructive tests for methylene blue in urine which I have worked out are the following :

1. The addition of hydrochloric acid bleaches the urine.
2. The addition of hydrochloric acid to the blue chloroform layer decolorizes same.
3. The addition of sodium hydroxide T. S. (but *not* of *KOH*) destroys the blue or greenish-blue color of the urine.
4. The addition of the same reagent to the blue chloroform layer changes same to be a violet purple forming methyl violet.

Other distinctive tests for methylene blue in urine and also differential tests from indigotin will be experimented with and will be reported at a later date.

Remarkable Phenomena.—As I stated before the samples of methylene blue urine were set aside in bottles, corked and numbered. Imagine my surprise when about two weeks thereafter I found all the samples faded with the exception of Nos. 1 and 2, the first urination which contained the largest quantity of methylene blue. Furthermore the urine was not putrid, but well preserved, showing that methylene blue possesses such properties. However, my surprise became still greater when after shaking the bottles and quite especially when admitting air the urine became again green or greenish-blue as you can see yourselves by this demonstration.

The different tests can be applied to the urine in the same way as to the fresh samples. After standing a short time the blue or green color will fade again.

As this is evidently a process of reduction and oxidation which is unusual and which I have not seen published before, I take pleasure in bringing it before the Scientific Section of A. Ph. A. for discussion.

On motion, the Section here took a recess until 3 o'clock, P. M.

ADJOURNED SESSION, FRIDAY AFTERNOON, MAY 6TH, 1910.

The Session assembled at 3 o'clock, Mr. William O. Richtman, Associate, acting as Chairman.

THE CHAIRMAN: Our first paper this afternoon is by Mr. Henry Kraemer, "The Anatomy of Phlox Carolina."

MR. KRAEMER: I would like to present both of my papers—the one to which the Chairman has just referred, and another which is down on the program as "A New and General Adulterant of Foods and Drugs." I will present the latter first.

A NEW VEGETABLE ADULTERANT.

(Outer Layers of the Pericarp of the Fruit of *Juglans regia* L.)

BY HENRY KRAEMER.

At the Pharmaceutical Meeting of the Philadelphia College of Pharmacy held November 16, 1909, Mr. E. H. Gane exhibited a sample of "vegetable shells," which he stated were imported probably for the purpose of replacing walnut shells, olive pits, etc., owing to the ease with which these latter products can now be detected when used as adulterants. (See *Am. Journ. Pharm.*, 81, p. 597, December, 1909.)

A preliminary examination of the sample showed that it was composed of the pericarp of some fruit. I then gave the sample to one of my students, Mr. Peter Amsterdam, to study microscopically and in comparison with the pericarps of similar fruits in our collection. This study showed that the material consisted of the hulls, or outer layers of the pericarp, of the fruit of *Juglans regia*, or English walnut, the nuts of which are common in the markets as an article of food.

The hulls (outer portion of the pericarp) of the fruit of *Juglans regia* have been used in the fresh and green condition in medicine, and are described in foreign works under the name *Cortex Fructus Juglandis* (*Cortex nucum Juglandis viridis*. *Grüne Walnusschalen*. *Brou de noix*). The hulls are described by Vogl in his Pharmacognosy, and a rather extensive article on their histology is given by Hartwich in the *Archiv der Pharmacie*, 66, p. 325 (1887).

Macroscopic Characters.—The dried hulls, or "shells," consist of pieces or fragments composed for the most part of the outer layers of the pericarp, the epicarp and sarcocarp. The pieces are more or less irregular, involuted, shriveled, vary from 5 to 35 mm. in diameter, and break with a short fracture. Some of the pieces are marked by the stem-scar or still have attached to them portions of the stem. Externally, the epicarp, or outer layer, is rather smooth, though coarsely wrinkled, marked by numerous small dots, and varies in color from light to dark brown. The sarcocarp, or inner layer, is somewhat spongy, dark brown or blackish-brown in color, and more or less fibrous, due to the shrinking of the parenchyma from the fibro-vascular bundles.

The taste of the hull is markedly acid and somewhat bitterish, but the odor is not very pronounced or characteristic.

Microscopic Characters.—The epicarp shows the presence of numerous broadly elliptical stomata (Fig. A) which are from 50 to 70 microns in length; the opening between the guard-cells is large, and sometimes irregular in outline, or the guard-cells may be separated along the adjoining walls, due to the unequal development of the tissues. The blackish-brown spots which mark the outer surface of the epicarp are made up of tannin-containing cells which appear to be under the influence of a local

stimulus of some kind, the area affected being 0.2 or 0.3 Mm. in diameter. The epidermal cells are more or less polygonal, the cuticle being from 2 to 5 microns thick (Fig. B, e). Beneath the epidermis are two to three rows of tabular cells, usually containing a reddish-brown or tannin-containing sap (Fig. B, c); beneath these sub-epidermal cells is a continuous ring or zone (Fig. B, s) made up of three or four layers of stone cells, the walls of which are strongly lignified, lamellated, and finely porous. The cells vary from tabular to irregular, and may or may not contain a reddish-brown tannin-like substance, the tannin being in the cells of the specialized areas already described.

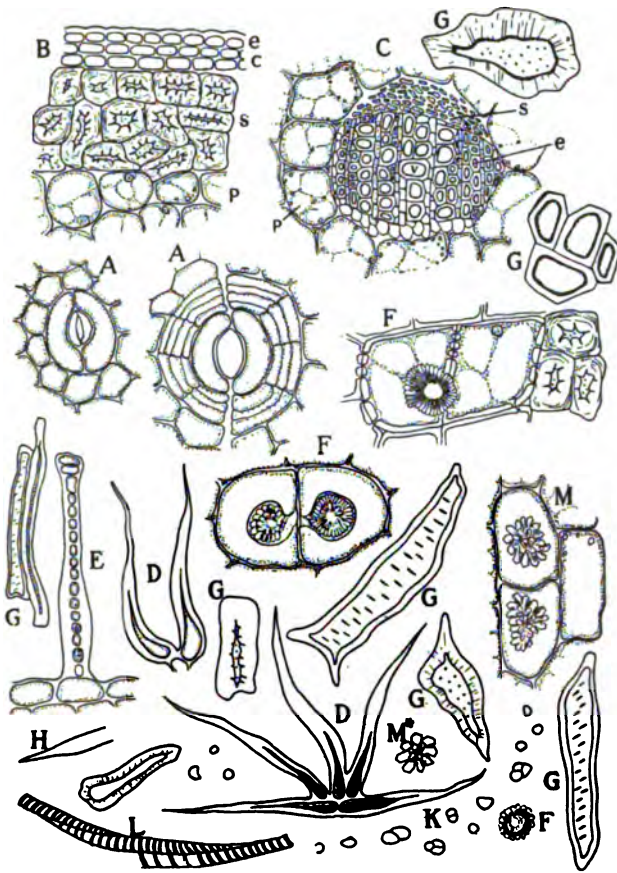
Beneath this zone of stone cells occur the tissues of the sarcocarp proper (Fig. B, p). This portion consists of parenchyma and fibro-vascular tissue. The cells of the parenchyma contain small starch grains and occasionally rosette aggregates of calcium oxalate which vary in diameter from 25 to 40 microns, and sometimes may be found in large numbers in the parenchyma cells adjoining the fibro-vascular bundles.

The parenchyma cells of the sarcocarp of the young fruits have very thin walls, but in the older fruits the walls of very many of the cells become lignified and have large oblique pores. The tracheae are in radial rows usually two cells wide separated by medullary rays one cell wide. They are spiral.

At both the apical and basal portions of the fruit occur curved, spear-shaped, unicellular, non-glandular hairs (Fig. D) resembling those found on the pericarp of the cereal grains, but distinguished from the latter by the fact that they are frequently united to form stellate groups resembling those of kamala and those occurring on the leaves of Hamamelis. The contents may be colorless or consist of a brown reddish-brown tannin-like substance. There are also present, usually at the base of the fruit, and also on the stems, when these are present, long-stalked glandular hairs (Fig. E) similar to those covering the fruit of *Juglans cinerea* (Butternut.) While the stalk is long and multicellular in the hairs of both species, the glandular head in the hairs of *Juglans regia* appears for the most part to consist of one or two cells, whereas in *Juglans cinerea* it is usually multicellular, resembling the glandular heads of the hairs of the Labiatae.

In the parenchyma cells of the basal portion of the hull there are a large number of rosette aggregates or spherites of crystals resembling crystals of calcium oxalate (Fig. F). These aggregates are more or less hollow, frequently attached to the cell-wall, sometimes more or less enclosed by the cell-wall, and thus resemble the membrane crystals of Rosanoff (See Kraemer, Botany and Pharmacognosy). These aggregates differ from those found in the stem, which are the typical calcium rosette aggregates of calcium oxalate, and are deserving of special study.

Characteristics of the Powder.—The color is dark brown or blackish-brown, the odor faint, and the taste distinctly acid and slightly bitter.



Pericarp of fruit of *Juglans regia*.

A, stomata, of epicarp.

B, cross-section of pericarp, showing epidermis (e), cells with reddish-brown contents (c), sclerotic cells (s), parenchyma (p) containing protoplasm and starch grains. C, mestome strand of the sarcocarp showing vessels (v), libriform (l), leptome (s), parenchyma containing protoplasm and starch (p).

D, non-glandular hairs from the apical and basal portions of fruit.

E, glandular hairs from base of fruit similar to those found in large numbers on the surface of the butternut (*Juglans cinerea*).

F, rosette-aggregates resembling the membrane crystals of Rosanoff.

G, sclerotic cells found in the powder.

H, fragment of non-glandular hair.

K, starch grains from 2 to 10 μ in diameter.

L, tracheae with annular markings.

M, calcium oxalate crystals.

The most characteristic elements of the powder are the stone cells (Fig. G.), some of which contain only air, thus resembling those of the olive pit, and some of which have a reddish-brown content; there occur besides fragments of the stalks of the glandular hairs (Fig. D), fragments of the non-glandular hairs (Figs. D and H), small starch grains, (Fig. K) the two types of rosette aggregates of calcium oxalate crystals (Figs. F. and M.), and large, thin-walled, somewhat shrunken parenchyma cells, many of which contain either small starch grains or reddish-brown masses, or cells with rather thick walls having large simple pores and being more or less lignified, approaching stone cells. The latter sometimes contain the Rosanoff crystal aggregates already mentioned.

When the hulls of *Juglans regia* are treated with water the solution soon shows a reddish-brown color which becomes much deeper on the addition of aqueous solutions of the alkalies. The aqueous extract of black pepper hulls, and black walnut shells (endocarp) have a color similar to that of the hulls of *Juglans regia* and behave similarly towards solutions of the alkalies. The aqueous extract of pecan shells (endocarp) is of bright-red or cherry-red color, but becomes on the addition of alkalies of a dark reddish-brown color similar to that of the extract of the hulls of *Juglans regia*. Cloves give a reddish-yellow aqueous extract which becomes deep red on the addition of solutions of the alkalies. The aqueous extracts of the following are either nearly colorless or range from a pale yellow to a pale yellowish-red, or pale olive-green; and are not turned a dark reddish-brown on the addition of alkalies: Black pepper, white pepper, Ceylon cinnamon, Cassia cinnamon, Saigon cinnamon, pimenta, ginger, English walnut shells (endocarp), olive endocarp (olive pits), peanut shells, Brazil nut shells (seed coat), and butternut shells (endocarp).

THE CHAIRMAN: The paper is now before you for discussion, if desired.

MR. CLARK: I would like to ask Dr. Kraemer if he has seen this adulteration in any particular substance, more than in others?

MR. KRAEMER: The substances in which I may have met this adulterant were powders that were supplied to us, and I did not consider it at the time of sufficient importance to indicate that something else was added, and it was not until my studies upon *Juglans* that I was inclined to the opinion that the stellate hairs possibly did not come there by accident. For instance, in a laboratory such as we have, it is possible to conceive that the stellate hairs of Kamala might have accidentally gotten upon the slide or in the reagent. When one meets something of this kind, which is manifestly out of the way, and not likely to be used as an adulterant, one would not suppose that Kamala had been used. I simply mention this because I have observed these branching or stellate hairs on a number of occasions. I can not for the moment recall just what powdered drugs were examined at the time.

THE CHAIRMAN: If there is no further discussion, we will take up the next paper.

MR. KRAEMER here read his paper on "The Anatomy of Phlox Carolina."

THE HISTOLOGY OF THE RHIZOME AND ROOTS OF PHLOX OVATA L.
(PHLOX CAROLINA L.).

BY HENRY KRAEMER.

For some time I have felt the importance of making studies of the structure of the underground portions of American plants, as there are so many vegetable fragments of unknown origin in many cases which are found admixed with the more common drugs, and which have a superficial resemblance to them. Thus, unless careful garbling is practised, these foreign plant parts may not only be found as an admixture, but as an entire substitute for the genuine drug.

My interest in *Phlox carolina* dates back some twelve years when, at my request, Mr. C. D. Beadle, of the Biltmore Herbarium, sent me a number of plants which he collected in the mountains of North Carolina. While I did not make an extended study of the material at the time, I examined it sufficiently to lead to the conclusion* that the material which Greenish described in his paper did not answer to the description of *Phlox carolina*. My main object at that time was to determine the origin of a substitute for *Spigelia*, in which one of my students at Northwestern University discovered by accident the presence of calcium carbonate. This substitute was shown subsequently and independently by Stockberger† and Holm‡ to be the rhizome of *Ruellia ciliosa*.

In connection with their studies on *Spigelia marilandica* and *Ruellia ciliosa*, these authors have also described the structure of *Phlox ovata* (*Phlox carolina*). While the papers of Stockberger and Holm are excellent contributions to the subject, there are still some features which should be brought out more distinctly, especially from the practical pharmacognostic point of view. Stockberger considers that the rhizome and roots of *Phlox ovata* "rarely or never occur as a substitute for *Spigelia*," and I agree with him in a measure, but its occurrence is still reported and, besides, workers do not seem to be clear in regard to the characters of the drug. I do not, however, agree with the statement made by Stockberger that "the root so generally described and studied as *Phlox* must be referred to *Ruellia*," which latter drug I hope to take up later.

In order that errors may be eliminated from the literature, it should be pointed out that in the English translation of Solereder's "Systematic Anatomy of the Dicotyledons," which appeared as recently as 1908, the translators continue the mistake in the original German edition of accepting as true the description given by Greenish§ of what he had reason to

Literature Cited.

* Kraemer: "A Course in Botany and Pharmacognosy," 1902, p. 157.

† *Pharmaceutical Review*, 25, pp. 2, 33, 65, 97 (1907).

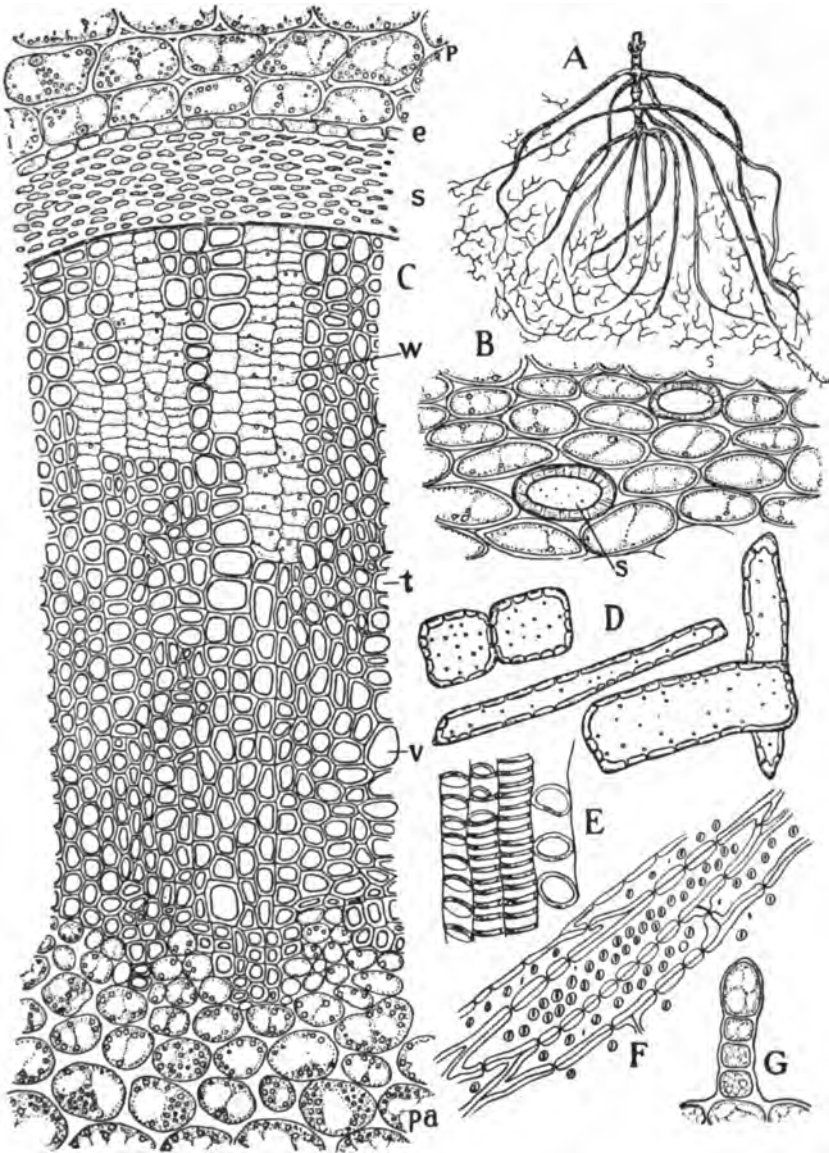
‡ *AM. JOUR. PHARM.*, 78, p. 553; 79, p. 51 (1907).

§ *Pharm. Jour. and Trans.*, 21, p. 839 (1891); *AM. JOURN. PHARM.*, 63, p. 226 (1891).

suppose was *Phlox carolina*, but which it has since been seen was not an authentic specimen. It should also be pointed out for the benefit of practical workers that the material studied by Professor Greenish was drug material, some of which was supplied by Professor Maisch, but neither of them is open to criticism, both of them having accepted as probably genuine what was supplied them, as was then more customary. Indeed, Professor Greenish did a very excellent piece of work, and nothing would have been left to be desired if he had known the name of the plant from which the material with which he worked was derived and had named his paper accordingly, that is, by substituting the name *Ruellia ciliosa* for *Phlox carolina*. Later experience also shows that it is extremely hazardous to base a study of a vegetable drug on the commercial material alone, and that no studies of this kind can be considered entirely reliable or authoritative which are not based upon material collected from or compared with that derived from plants which have been identified.

The species belonging to the genus *Phlox* are found chiefly in North America, where they number about thirty. The plants are mostly herbaceous perennials, a number of the species being extensively cultivated for ornamental purposes. The stems are either decumbent or ascending, or in some cases they are slightly decumbent near the base and then ascending, as in *Phlox ovata*. *Phlox ovata* is found in open mountainous woods from Alabama to Pennsylvania, and there are some colored plates representing this plant in the Botanical Magazine (t. 528 and 1344). According to Gray, in his "Flora of North America," *Phlox carolina* is merely a taller form of *Phlox ovata*, but having narrower, more tapering leaves and pointed calyx teeth, approaching *Phlox glaberrima*. According to botanists to-day, the form with ovate or ovate-lanceolate leaves is regarded as the typical species, and the name *Phlox carolina* has been superseded by *Phlox ovata*.

Phlox ovata generally attains a height of from 3 to 6 decimeters. The stems are cylindrical, smooth, and the diameter is from $2\frac{1}{2}$ to $3\frac{1}{2}$ Mm. Thus, they are seen to be slender stems, and in order to maintain their perpendicular position would need to be quite woody, especially in the lower portion, which they are. The so-called rhizome, which is merely an extension of the over-ground stem, is usually vertical, comprising from two to four nodes, and usually 1 to 2 Cm. long. From the nodes arise from two to four comparatively thick roots, which are sometimes nearly 2 Mm. in diameter in the fresh state, from 1 to 2 decimeters long, unbranched, and produce a large number of fine rootlets, especially near the free ends (Fig. A). The commonly vertical character of the rhizome of *Phlox ovata* is one of the features which distinguishes it from the rhizomes of both *Spigelia* and *Ruellia*, although it should be stated that occasionally decumbent stems are found which produce roots at the nodes. In neither case is that part of the stem producing roots a true rhizome.



Phlox ovata L. (*Phlox carolina* L.): A, lower portion of plant showing long roots, numerous rootlets at the end; B, parenchyma from cortex of rhizome showing two sclerotic cells (s); C, cross-section of portion of rhizome showing parenchyma of cortex (p) which contains protoplasm and starch grains, endodermis (e), leptome (s), tracheae (v), libriform (t), wood parenchyma (w), parenchyma of pith containing starch grains and protoplasm (Pa); D, isolated sclerotic cells from cortex; E, vessels with annular and spiral thickenings; F, libriform cells; G, glandular hair from the leaf.

The rhizome, or underground part of the stem, is characterized by a strong development of woody tissue, which in transverse section occupies about one-half of the radius. The bark is about 0.5 Mm. in diameter, the xylem and phloem together are about 0.9 Mm. in diameter, and the radius of the pith is 0.3 Mm.

Histological Characters of Rhizome.—The epidermis in transverse section is made up of rounded tabular cells and is surrounded by a cuticle which is more or less lignified and 8 to 10 microns in thickness. Beneath the epidermis are two to four rows of collenchymatous cells, the remainder of the cortex being made up of about twelve rows of parenchyma cells, the walls of which are about 5 microns thick, the cells themselves being from 40 to 80 microns in diameter. All of the cells of the cortex are rich in protoplasmic contents, and sometimes contain a considerable number of small starch grains, 1 to 3 microns in diameter. Beneath the cells of the cortex there is usually a well-defined ring of endodermal cells, which may be more or less lignified, and which may also contain a few small starch grains. Beneath the endodermis is a layer of pericambial cells, which show one or two tangential divisions. Next beneath is the sieve, which is made up either of thin-walled, somewhat tabular cells, or of oval, very thick-walled cells. The sieve cells are rich in protoplasmic contents, and frequently contain a number of starch grains. The xylem portion of the fibrovascular bundles (Fig. C) is made up of at least two, and frequently three areas—an outer layer composed of compact, strongly lignified cells, which are present in more lignified stems but not here illustrated; a middle layer, as in Fig. C, in which there are radial rows of parenchyma cells separating the thick-walled, lignified cells; and a continuous zone of lignified cells, as in Fig. C. The tracheæ are marked with bordered pores, and those near the centre of the rhizome have annular and spiral markings, the number of tracheæ thus marked being rather striking and characteristic. Most of the lignified cells of the xylem are in the nature of tracheids, which are narrower and longer than those in *Spigelia*, being usually not more than 20 microns in diameter and about 500 microns long (Fig. F). The parenchyma cells in the outer layers of the wood not infrequently show the presence of a number of small starch grains similar to those already described. Underlying the xylem tissue somewhat tabular cells, resembling those of the sieve, sometimes occur, but for the most part all of the cells beneath the xylem, constituting the pith, are made up of somewhat thick-walled parenchyma cells resembling those of the cortex. The walls of these cells are non-lignified, and are wanting in simple pores. The cells are rich in protoplasmic contents, and may contain a large number of starch grains.

The most characteristic features of the rhizome *Phlox ovata* may be enumerated as follows: (1) The upright or vertical position of the rhizome; (2) the few rather long and comparatively thick roots extending from the

nodes; (3) the comparatively thick xylem; (4) the absence of an internal phloem, the fibrovascular bundles being of the collateral type, and (5) the presence of starch in at least the rhizomes of the fruiting plants. The fact that neither Stockberger nor Holm found starch in this rhizome is probably due to their having worked with material in which it was present in rather small quantities, the amount varying unquestionably with the season of the year. I especially mention this point, in view of the fact that Stockberger places *Phlox* in a group in which starch is wanting, and calls attention to its supposed absence as a differentiating character.

The tendency of this plant to produce mechanical cells is further shown by the fact that some of the cells of the pith as well as of the cortex are thick-walled, strongly lignified, the walls being marked by rather fine simple pores (Figs. B, D). These cells as they occur in the pith are either cubical, or elongated, and with square ends, while those in the cortex are narrow, with pointed or oblique ends, and from 100 to 500 microns in length. Somewhat similar stone cells are found in the stem of *Phlox pilosa* L. If the material containing these cells should be relatively abundant in a mixture, their presence would give another character for distinguishing the rhizome of *Phlox* from that of *Spigelia*. The stone cells in *Ruellia* are different in shape, and in addition are associated with cells containing calcium carbonate. The presence of these special, thick-walled lignified cells in the rhizome of *Phlox* may, however, be of infrequent occurrence, like the bast fibres in belladonna, which I have only occasionally seen, but which have been described by Schrenk, and therefore may not be of assistance in the identification of the drug. It might be mentioned in this connection, however, that groups of bast fibers have been found in *Phlox aristata* Michx., and a ring of bast fibers in the stem of *Phlox longifolia* Nutt., *P. Douglassi* Hook., and *P. acuminata* Pursh.

Histological Characters of Root.—A transverse section of the root shows 1) ordinary epidermal cells with root-hairs; (2) a hypodermis made up of radially elongated, more or less pentagonal cells; (3) a cortex, consisting of 12 to 20 rows of ellipsoidal rather thin-walled parenchymatous cells, which are rich in protoplasm and may contain small starch grains; (4) a peripheral layer of the central cylinder; (5) endodermis; (6) internal layer of cortex, and (7) within this there is in the very young roots a triarch to pentarch radial fibrovascular bundle, which later becomes collateral and closely resembles in structure that of the rhizome.

While the stem is free from hairs the leaves have rather striking glandular hairs (Fig. G), which are found on the principal veins near the base of the leaf. The histological characters of the leaf have been very well given by Holm, and it therefore does not seem necessary to consider them here.

I may say in conclusion that I am engaged in the study of the structure of the underground parts of other species of *Phlox*, as possibly the

rhizomes, and roots of other species may occur as admixtures in drugs, and besides the genus is of great interest botanically.

THE CHAIRMAN: The paper is before you for discussion.

MR. TRUE: I have listened to Dr. Kraemer with great interest, because about fifteen years ago the condition of the material known as spigelia, on the market, came to my attention, and at that time in overhauling samples that came from various commercial sources, I was led to the conclusion that things were not right with this phlox, and looked into the question of the adulteration of phlox in spigelia. I could find no evidence of phlox being present. Somewhat by accident, it was about 1893, I believe, I ran across evidence sufficient to convince me that the adulterant present was not phlox, as was supposed, and I felt justified in assigning this thing to the genus *Ruellia*. A brief note on this subject was published at the time. Sometime later we wished to make a purchase of spigelia for our drug garden. This was most ten years ago. We bought the roots and put them in, and to my dismay they came out very light, but gave us the material that was necessary for my opinion; we were able to identify it botanically, and have grown it in our drug garden at Arlington. In our display upstairs you will find a number of the plants that we have grown in our drug garden, and which at Dr. Rusby's request we have sent down here. The question of phlox, as Dr. Kraemer has discussed it here, is extremely interesting, as I have said. I am interested to know that he has found starch. I might further say, to add to the oddity of the situation, that Dr. Stockberger had this plant growing, and we had it under observation year after year and did not find it. I may say, however, that this material was grown, and came to us from the north. It was originally southern material and taken to the Harvard Botanic Garden, and acclimatized there, and brought from there south—so this material has had a season in the north. Whether that would change its habits in any way, I don't know. The fact that Dr. Kraemer finds starch, seems to me to be rather as was expected, and I have been extremely interested to hear all he said about it. In view of the fact that *Phlox Carolina* has not had as much attention given to it heretofore as its importance in the laboratory would seem to require, I think Dr. Kraemer's paper is a very happy contribution to this already voluminous literature.

MR. KRAEMER: I have not brought out in this paper, that the whole genus of *Phlox* is known to have reserve starch. It is referred to by Solereder, in his "Systematic Anatomy of the Dicotyledons" so that it is not very remarkable that I should have found it present. My material is of fruiting plants collected in the vicinity of Asheville, North Carolina, and has considerable starch in it. The important point I have tried to bring out is not so much the presence of starch, but the undue emphasis that has been laid upon the absence of it as a characteristic *Phlox carolina*.

THE ACTING CHAIRMAN: It is rather unfortunate that our Chairman is not with us this afternoon, as he is familiar with the program, whereas your acting chairman is entirely unfamiliar with it.

MR. DOHME: May I interject a matter which I think of interest, and which can be disposed of by the Section? I have in my hand a copy of the principles to be handed to the Committee of Revision, of the U. S. Pharmacopoeial Convention and I have been asked to present it to this Section and request the Section to take such action on them as it sees fit, before they are brought up in the general convention to-morrow. You will recall that the Committee on the U. S. P. made these recommendations and they were ordered to be printed and distributed among the members, so that they would be in position to vote upon them tomorrow, in the general convention. Mr. Beringer asked

me to bring them down here, and he will be here a little later in order to discuss them. I will put them in your hands, and I think it would be well to distribute them among the members here.

ACTING CHAIRMAN: As the Chair remembers the situation, action was to be taken on these recommendations at the close of this Section. Inasmuch as this is the closing session of this Section I presume action will have to be taken on them at this session. If agreeable, we will continue our program, and probably by the time we conclude it our Chairman will be back, and also Mr. Beringer will be present, and we can then take the matter up.

The next paper on the program is on "The Stability of Calcium Sulphide Tablets," by H. Engelhardt and M. R. Schmidt.

The paper was here presented by Mr. Dohme.

CALCIUM SULPHIDE PILLS AND TABLETS.

BY M. R. SCHMIDT AND H. ENGELHARDT.

Having received a complaint alleging deterioration of a lot of Tablet Triturates Calcium Sulphide during the course of a year, we thought it advisable to make a rather detailed study of the question, and accordingly examined 70 samples of calcium sulphide preparations, including sugar-coated and chocolate-coated tablets, tablet triturates, as well as gelatin-coated pills.

The following method was used: 20 Cc. of tenth-normal iodine solution were run into a glass-stoppered flask for every grain of calcium sulphide, tablets or pills added, usually amounting to 1 or 2 grains, and the mixture made strongly acid with hydrochloric acid. The flask was allowed to stand with frequent shaking until the calcium sulphide was decomposed. The excess of iodine was titrated back, and each Cc. of iodine solution consumed in oxidizing the hydrogen sulphide to sulphur represents .0036 Gm. of calcium sulphide. The weight of calcium sulphide indicated was then divided by .55, the content of absolute calcium sulphide required by U. S. P. and the quotient divided by the grainage of the tablet or pill under examination, expressed in grams. The figure thus obtained multiplied by 100 represents the actual percentage of the grainage on the label which was present in the tablets.

Our results show that in no case has noticeable deterioration taken place, and some of the preparations were as much as three years old. Averaging all the results, we found that about 105 per cent. of the grainage stated on the label is actually present. In order to determine whether superficial deterioration might have taken place, one dozen samples of triturates were selected, with grainages ranging from $\frac{1}{4}$ to 2 grains. After weighing four of each lot, about 25 to 40 per cent. of each tablet was cut off from the outside, the remaining inside portion weighed, and the calcium sulphide determined in this remainder as before. The amount of

calcium sulphide found in the reduced tablet was equal to the amount calculated from the reduced weight, within the limits of experimental error.

In connection with these experiments we procured tablets of several different makes and different grainages in the open market, and we found that these tablets likewise came up satisfactorily to the required strength.

A representative sample of a lot of calcium sulphide was also assayed, and showed 58.50 per cent. Calcium Sulphide. This figure is 106.3 per cent. of the U. S. P. standard, and agrees very well with the excess grainage found in the preparations.

THE ACTING CHAIRMAN: Is there any discussion on this paper?

MR. DOHME: As long as this matter is up for consideration by the Revision Committee, and the Committee on Pharmacopœia, I think I can give some very interesting information, which would be of service to the committee. About four years ago the then superintendent of our establishment, made a series of experiments, I believe about seventy-five, of the triturates, selecting particularly those that were prone to change, such as the iodides of mercury, and some of the alkaloid triturates, and a general line covering most of those generally used. He examined them a month after they were made, and put them in an ordinary clean bottle and exposed them on the shelf in his laboratory, so that they would have about the same conditions surrounding them as in a retail drug store. He examined them at the end of a year and found that not one had lost any percentage at all in its active ingredients. He then examined them again at a subsequent period, which I think was about two years after he made his first experiment, and found that none of them had lost any of their active ingredients, to his great surprise; and in his paper he attributed it, as I have always attributed it, to the preservative qualities of sugar of milk; that the reducing qualities of sugar of milk are a sufficient protection.

MR. VANDERKLEED: I am glad to see this question of the permanence of the tablet triturates brought out, owing to the fact that it has been stated on many occasions that tablets of certain kinds were unstable. I think that the study of this question will serve to emphasize the point that Dr. Dohme has brought out, that these preparations are quite stable; and also that variations in them are due not to subsequent deterioration, but to the fault of the manufacturer in the first place, and the idea that the tablet is deteriorating is rather due to the fact that it never was right. I think a study of the tablets on the market is a very valuable one to undertake and report upon.

MR. C. E. CASPARI: I have heard a little different experience from that of Dr. Dohme, especially with tablets of mercury; these were made with sugar of milk, and not exposed to the light at all; there was a marked reduction, and at the same time oxidation; they changed color very rapidly.

MR. DOHME: Of course it is an essential thing that your sugar of milk should be absolutely pure. You have to reject some every now and then. Of course there is sugar of milk made that is really not fit for use as a medicinal agent, because it is evidently very carelessly and imperfectly made; and it is a very important matter in pharmaceutical preparations to get your sugar of milk of the very highest grade of purity, and free from the presence of organic substances which are apt to be present. My experience has been that if you get it from the right source, and demand the right kind of crystals, you have very little trouble with this substance. I might say that the fact that some triturates, made by some people, will not keep the way they should, is probably due to

the fact that they do not exercise the necessary care in the examination of their sugar of milk.

THE CHAIRMAN: If there is no further discussion, we will pass on to the next paper—"The Composition of Strychnine Arsensate," by W. A. Puckner and L. E. Warren.

Mr. Puckner here presented the paper just mentioned, and also the one following on the program, by the same authors, "The Composition of Commercial Copper Citrate."

THE COMPOSITION OF STRYCHNINE ARSENATE.

W. A. PUCKNER AND L. E. WARREN.

The consideration of strychnine arsenate was taken up by the Council with the view of its inclusion with New and Nonofficial Remedies. As very little information could be obtained concerning the chemistry of this salt, and some of the statements found were contradictory, the Association laboratory deemed it advisable to examine the several brands of the product as now sold on the American market. Accordingly specimens of these were purchased and submitted to examination.

Strychnine arsenate was probably first prepared by Chiappero.* He obtained it in two forms. The "arsenate" was prepared by heating 3.34 parts of strychnine with 1.15 parts arsenic acid dissolved in 40 parts of water. This salt, according to Chiappero, contains 1 molecule of alkaloid, 1 of acid and 5 molecules of water. It is said to be soluble in 15 parts of water.

The "subarsenate" was prepared by heating 6.6 parts of strychnine in 1.15 parts arsenic acid dissolved in 40 parts of water. According to Chiappero this salt contains 2 molecules of alkaloid, 1 of acid and 6 molecules of water, and requires 40 parts of water for solution.

The literature contains but very little information concerning the properties of strychnine arsenate and that little is very contradictory. For example, in Squibb's *Materia Medica* † the solubility (of the salt sold by that firm) is given as 1 in 70 of water. Merck's Index ‡ gives the solubility as 1 in 14 of water, while, as previously noted, Chiappero's salts are said to be soluble in 15 and 40 parts of water respectively.

Specimens of strychnine arsenate were examined, which were sold under the labels of the following firms: E. R. Squibb & Sons; Merck & Co.; Mallinckrodt Chemical Works, and Powers, Weightman, Rosengarten Co.

Squibb's product was a coarse white powder which, under the microscope, was seen to be composed of colorless, transparent prisms. Merck's specimen was a white crystalline powder. Mallinckrodt Chemical Works specimen was a coarse, crystalline white powder with a faint yellowish

* *Cann. Jahrber. f. Pharm.*, 152 (1861); also *A.Ph.A., Proc.* 11, 151 (1863).

† *Squibb's Materia Medica*, 232 (1906).

‡ *Merck's Index*, 426 (1907).

tinge. It was made up of colorless transparent prisms and opaque faintly yellowish white masses. The Powers, Weightman, Rosengarten Co. specimen was similar in appearance to the Squibb specimen.

ANALYTICAL.

Solubility.—The solubility of strychnine arsenate in water at 25° C. was determined in 2 specimens. The determinations were made according to the method, and in the apparatus described by Pawlenski. (Ber., 23, 230, 1908). About 3 Gm. of the finely powdered salt and 10 c.c. of water were employed in each of the determinations, thus using a large excess of the salt over its solvent.

Results.—P. W. R. Brand; 8.8926 Gm. of the saturated solution gave 0.4047 Gm. dried residue, equivalent to 0.42907 Gm. crystallized salt. 8.8926 Gm. solution contain 0.42907 Gm. salt and 8.49633 Gm. water. 0.42907 Gm. salt dissolved in 8.49633 Gm. water indicates a solubility of 19.80 at 25° C. for the crystallized salt. 8.9260 Gm. of the solution contain 0.4047 Gm. anhydrous salt and 8.5213 Gm. water, equivalent to solubility of 21.03 for the anhydrous substance at 25° C. 7.4861 Gm. of the aqueous solution saturated at 25° C. gave a dry residue of 0.3380 Gm., equivalent to 0.35834 Gm. crystallized salt. 7.4861 Gm. of the solution contain 0.35834 Gm. crystallized salt and 7.12776 Gm. water, equivalent to a solubility of 19.89 in water at 25° C. 7.4861 Gm. of the solution contain 0.3380 Gm. dry salt and 7.1481 Gm. water, corresponding to a solubility of 21.15 for the dry salt at 25° C. Average: 1 part crystallized strychnine arsenate (P. W. R. brand) requires 19.85 parts of water for solution at 25° C.; 1 part anhydrous strychnine arsenate requires 21.09 parts of water for solution at 25° C. M. C. W. brand; 8.0954 Gm. of the aqueous solution at 25° C. gave 0.3759 Gm. dried residue, equivalent to 0.38016 Gm. crystallized substance. 8.0954 Gm. of the solution contain 0.38016 Gm. salt and 7.71524 Gm. water, equivalent to a solubility of 20.30 at 25° C. 8.0959 Gm. solution contain 0.3759 Gm. anhydrous salt and 7.7200 Gm. water, equivalent to a solubility of 20.54 at 25° C. 6.3436 Gm. of the aqueous solution saturated at 25° C. gave 0.2885 Gm. dry residue, equivalent to 0.29177 Gm. crystallized substance. 6.3436 Gm. of the solution contain 0.29177 Gm. strychnine arsenate and 6.05183 Gm. water, corresponding to a solubility of 20.74 at 25° C. for the crystalline substance. 6.3436 Gm. of the solution contain 0.2885 Gm. anhydrous strychnine arsenate and 6.0551 Gm. water, corresponding to a solubility at 25° C. of 20.98. Average: 1 part of crystallized strychnine arsenate (M. C. W. brand) requires 20.48 parts of water for solution at 25° C.; 1 part of the anhydrous salt requires 20.76 parts of water for solution at 25° C. As was to be expected, the solubility of the specimen containing the most water of hydration required less water for its solution than the other.*

* As this article is completed, Schaefer's paper, "Solubility of Alkaloids of Cinchona

Water.—A weighed quantity of the salt was dried at 100° C., and the loss calculated as water. In the different specimens examined, water was found in amounts varying from 1.1 per cent. to 5.7 per cent.

Results.—Squibb brand ; 0.5023 Gm. lost 0.0083 Gm., equivalent to 1.65 per cent. ; 0.5029 Gm. lost 0.0084 Gm., equivalent to 1.67 per cent. ; average, 1.66 per cent. water. Merck brand ; 1.0099 Gm. lost 0.0236 Gm., equivalent to 2.34 per cent. ; 1.0005 Gm. lost 0.0215 Gm., equivalent to 2.15 per cent. ; average, 2.24 per cent. water. M. C. W. brand ; 1.0 Gm. lost 0.0112 Gm., equivalent to 1.12 per cent. ; 1.0029 Gm. lost 0.0113 Gm., equivalent to 1.12 per cent. ; average, 1.12 per cent. water. P. W. R. brand ; 1.0065 Gm. lost 0.0571 Gm., equivalent to 5.67 per cent. ; 1.0016 Gm. lost 0.0577 Gm., equivalent to 5.69 per cent. ; average 5.68 per cent. water.

Alkaloid.—One Gm. of the material was dissolved in about 50 Cc. water in a separator, a slight excess of ammonia water added, and the mixture extracted successive with several small portions of chloroform until extraction was complete. The chloroformic solutions were combined, placed in a separator and washed with 25 Cc. of water. The chloroform was drawn off, evaporated, the residue dried at 100° C. and weighed. In the several specimens examined alkaloid was found in amounts varying from 66.3 per cent. to 69.7 per cent.

Results.—Squibb brand ; 1.0002 Gm. gave 69.89 Gm. alkaloid, equivalent to 69.88 per cent. ; 1.0006 Gm. gave 0.6965 Gm. alkaloid, equivalent to 69.61 per cent. ; average, 69.74 per cent. alkaloid. Merck brand ; 1.0099 Gm. gave 0.6973 Gm. alkaloid, equivalent to 69.05 per cent. ; 1.0005 Gm. gave 0.6902 Gm. alkaloid, equivalent to 68.98 per cent. ; average, 69.02 per cent. alkaloid. M. C. W. brand ; 1.0 Gm. gave 0.6872 Gm. alkaloid, equivalent to 68.72 per cent. ; 1.0029 Gm. gave 0.6879 Gm. alkaloid, equivalent to 68.59 per cent. alkaloid ; average, 68.66 per cent. alkaloid. P. W. R. brand ; 1.0065 Gm. gave 0.6672 Gm. alkaloid, equivalent to 66.29 per cent. ; 1.0016 Gm. gave 0.6646 Gm. alkaloid, equivalent to 66.35 per cent. ; average, 66.32 per cent. alkaloid.

Arsenic Acid.—The aqueous solution remaining in the separator after removal of the alkaloid by chloroform, together with the aqueous washings from the chloroformic solution of the alkaloid, was evaporated to 25 Cc., magnesia mixture added, and the determination completed according to the method given in Olsen's Quantitative Chemical Analysis, p. 86 (1904). The results were calculated to arsenic acid (H_3AsO_4).



Bark and Their Salts in Water at a Temperature of 25° C." (Am. Jour. Pharm., 82, 175, 1910) has come to our notice. Experiments to determine the bearing of this on the above solubility determinations are under way.

The quantities of arsenic acid found by this method varied from 27.2 per cent. to 28.9 per cent.

Results.—Squibb brand; 1.0002 Gm. gave 0.3111 Gm. magnesium pyro-arsenate, equivalent to 28.43 per cent. arsenic acid; 1.0006 Gm. gave 0.3103 Gm. magnesium pyro-arsenate, equivalent to 28.35 per cent. arsenic acid; average, 28.39 per cent. arsenic acid. Merck brand; 1.0099 Gm. gave 0.3116 Gm. magnesium pyro-arsenate, equivalent to 28.20 per cent. arsenic acid; 1.0005 Gm. gave 0.3091 Gm. magnesium pyro-arsenate, equivalent to 28.24 per cent. arsenic acid; average, 28.22 per cent. arsenic acid. M. C. W. brand; 1.0000 Gm. gave 0.3184 Gm. magnesium pyro-arsenate, equivalent to 29.11 per cent. arsenic acid; 1.0029 Gm. gave 0.3152 Gm. magnesium pyro-arsenate, equivalent to 28.73 per cent. arsenic acid; average, 28.92 per cent. arsenic acid. P. W. R. brand; 1.0065 Gm. gave 0.2997 Gm. magnesium pyro-arsenate, equivalent to 27.22 per cent. arsenic acid; 1.0016 Gm. gave 0.2974 Gm. magnesium pyro-arsenate, equivalent to 27.14 per cent. arsenic acid; average, 27.18 per cent. arsenic acid.

The arsenic was also determined by the sulphur dioxide reduction method (Rep. Chem. Lab. A. M. A. Vol. 1, p. 13). It consists in reducing the arsenic acid with sulphur dioxide in a pressure bottle, and subsequently titrating the arsenous acid with iodine in presence of sodium bicarbonate.

$$1 \text{ Cc. } \frac{N}{10} \text{ I} = 0.007046 \text{ Gm. H}_3\text{AsO}_4.$$

By this method arsenic acid (H_3AsO_4) was found in the several specimens examined in quantities ranging from 26.6 per cent. to 27.8 per cent.

Results.—Squibb brand: 0.5023 Gm. required 19.73 Cc. tenth-normal iodine, equivalent to 27.67 per cent. arsenic acid; 0.5029 Gm. required 19.82 Cc. tenth-normal iodine, equivalent to 27.77 per cent. arsenic acid; average, 27.72 per cent. arsenic acid. Merck brand: 0.5041 Gm. of the material required 19.72 Cc. tenth-normal iodine, equivalent to 27.57 per cent. arsenic acid; 0.5010 Gm. required 19.62 Cc. tenth-normal iodine, equivalent to 27.40 per cent. arsenic acid; average, 27.48 per cent. arsenic acid. M. C. W. brand: 0.5022 Gm. of the material required 19.775 Cc. tenth-normal iodine, equivalent to 27.75 per cent. arsenic acid; 0.5027 Gm. required 19.93 Cc. tenth-normal iodine, equivalent to 27.93 per cent. arsenic acid; average, 27.84 per cent. arsenic acid. P. W. R. brand: 0.5745 Gm. of the material required 21.66 Cc. tenth-normal iodine, equivalent to 26.57 per cent. arsenic acid; 0.5012 Gm. required 18.90 Cc. tenth-normal iodine, equivalent to 26.59 per cent. arsenic acid; average, 26.58 per cent. arsenic acid.

The analytical results obtained in the examination of the several brands are briefly shown in the appended table:

BRAND.	Water (Loss at 100° C.).	Alkaloid.	Arsenic Acid (Magnesia Method).	Arsenic Acid * (Titration Method).	Arsenic Acid (Average).	Total.	Solubility at 25° C.	
							Original Salt.	Anhydrous Salt.
Squibb.....	1.66	69.74	28.39	27.72	28.05	99.45		
Merck	2.24	69.02	28.22	27.48	27.85	99.11		
M. C. W.....	1.12	68.66	28.92	27.84	28.38	98.16	20.48	20.76
P. W. R.....	5.68	66.32	27.18	26.58	26.88	98.88	19.85	21.09

* Since the determinations of the arsenic acid by the two methods did not agree very closely, the methods were compared by working upon a solution of known arsenic content. A solution of arsenic acid was prepared by dissolving 3.4850 Gm. pure arsenic trioxide (Merck's reagent) in 50 Cc. of concentrated hydrochloric acid, adding sufficient concentrated nitric acid to oxidize the arsenous compound to the arsenic condition, boiling the solution in a reflux apparatus until free from chlorine vapors, and diluting the solution to 1 liter with distilled water. Qualitative tests indicated that the solution was free from arsenous compounds. Each Cc. of this solution contains 0.0050 Gm. arsenic acid (H_3AsO_4). The results obtained are given in the following tables:

SULPHUR DIOXIDE METHOD.

No. Cc. solution taken.	Arsenic acid taken (H_3AsO_4).	No. Cc. $\frac{N}{10}$ iodine consumed.	Arsenic acid found.	Percentage of theory.	Average.
25	0.125 Gm.	17.602	0.124023 Gm.	99.22	
25	0.125 Gm.	17.679	0.124566 Gm.	99.65	
25	0.125 Gm.	17.650	0.124362 Gm.	99.49	
25	0.125 Gm.	17.747	0.1250373 Gm.	100.03	99.600

MAGNESIUM PYROARSENATE METHOD.

No. Cc. solution taken.	Arsenic acid taken (H_3AsO_4).	$Mg_2As_2O_7$ found.	Arsenic acid found (H_3AsO_4).	Percentage of theory.	Average.
20	0.100 Gm.	0.1087 Gm.	0.099363 Gm.	99.36	
20	0.100 Gm.	0.1088 Gm.	0.099455 Gm.	99.46	
50	0.250 Gm.	0.2721 Gm.	0.248729 Gm.	99.49	
50	0.250 Gm.	0.2727 Gm.	0.249277 Gm.	99.71	
50	0.250 Gm.	0.2727 Gm.	0.249277 Gm.	99.71	99.55

In Merck's Index (1907) the formula for strychnine arsenate is given as $C_{21}H_{22}N_2O_2 \cdot H_3AsO_4 + \frac{1}{2}H_2O$. This corresponds to :

Strychnine.....	68.88 per cent.
Arsenic Acid.....	29.26 per cent.
Water	1.86 per cent.

The Squibb, the Merck and the Mallinckrodt specimens conform in a general way to the formula, $C_{21}H_{22}N_2O_2 \cdot H_3AsO_4 + \frac{1}{2}H_2O$, while the Powers-Weightman-Rosengarten specimen conforms more nearly to the formula $C_{21}H_{22}N_2O_2 \cdot H_3AsO_4 + 1\frac{1}{2}H_2O$. A glance at the subjoined table of analytical results and calculations will suffice to show the comparisons :

	$C_{21}H_{22}N_2O_2 \cdot H_3AsO_4 + \frac{1}{2}H_2O$			$C_{21}H_{22}N_2O_2 \cdot H_3AsO_4 + 1\frac{1}{2}H_2O$		
	Found.			Calc.	Found.	Calc.
	Brand.				Brand.	
	Squibb.	Merck.	M. C. W.		P. W. R.	
Water	1.66	2.24	1.12	1.86	5.68	5.37
Alkaloid	69.74	69.02	68.66	68.88	66.32	66.42
Arsenic Acid.	28.05	27.85	28.38	29.26	26.83	28.21
Total	99.45	99.11	98.16	100.00	98.88	100.00

Since strychnine arsenate as found on the American market varies somewhat in composition, the following provisional description of the product has been prepared :

Strychnine Arsenate. Strychninae Arsenas.—Strychnine arsenate ($C_{21}H_{22}N_2O_2 \cdot H_3AsO_4 + \frac{1}{2}H_2O$) is the binary strychnine salt of arsenic acid. Strychnine arsenate should contain alkaloid corresponding to between 68 and 70 per cent. of anhydrous strychnine.

Strychnine arsenate occurs as a white, crystalline powder ; or in small, colorless or faintly yellowish, transparent, or slightly opaque prisms ; or in white, acicular crystals ; odorless and having an extremely bitter taste. *Strychnine arsenate should be tasted with extreme caution.*

Slowly soluble in about 20 parts of water at 25° C., more readily soluble in hot water ; slightly soluble in alcohol ; insoluble in chloroform or ether. Its aqueous solutions are colorless and are precipitated by alkaline hydroxides and by alkaline carbonates. It is incompatible with alkalies and their carbonates, with tannic acid and other precipitants of the alkaloids.

Strychnine arsenate undergoes hydrolysis in aqueous solution so that if such a solution be shaken with chloroform an appreciable quantity of free alkaloid may be removed.

When heated to 100° C. (212° F.) the salt loses its water of crystallization. At about 210° C. (410° F) it begins to decompose without melting. At still higher temperature the salt chars, ignites and is finally dissipated.

When dried at 100° C. (212° F.) strychnine arsenate should not lose more than 2 per cent. of its weight (absence of an undue amount of *water*).

Sulphuric acid should produce no color with strychnine arsenate, but on adding a fragment of potassium dichromate, a blue color should be produced, changing to deep violet, then to purplish-red, cherry-red, and finally to orange or yellow. Sulphuric acid containing 1 per cent. of ammonium vanadate produces a deep violet-blue color, changing to deep purple, and finally to cherry-red. Sulphuric acid containing a trace of potassium iodate produces a violet color, changing to reddish-purple.

If 0.1 Gm. of the salt be dissolved in a few drops of nitric acid, the solution evaporated to dryness, and a few drops of ammonia water added to the yellow residue, an orange-red color will be produced, which will turn momentarily reddish-purple, and finally brown, on the addition of a small amount of alcoholic potassium hydroxide test solution.

If a little strychnine arsenate be treated with a few drops of nitric acid, on a white porcelain surface, not more than a faint yellow color should be produced. (limit of *brucine*).

If an aqueous solution of strychnine arsenate (1 : 50) be made slightly alkaline with ammonia water, and the alkaloid subsequently removed by shaking with chloroform, portions of the solution after being boiled to expel the dissolved chloroform and excess ammonia and acidified with nitric acid, should not give more than a very slight test for sulphates. Another portion of this solution should give upon the addition of magnesia mixture a white precipitate of magnesium-ammonium arsenate which soon becomes crystalline. Another portion of this solution, when treated with a few Cc. of diluted sulphuric acid and a few drops of iodine test solution, should not discharge the color due to iodine (absence of *arsenite*).

If an aqueous solution of strychnine arsenate (1 : 50) be acidified with diluted nitric acid and a few drops of silver nitrate test solution be added, not more than a slight opalescence should be given (limit of *chloride*).

Chemical Laboratory of the American Medical Association.

THE COMPOSITION OF COMMERCIAL COPPER CITRATE.

W. A. PUCKNER AND L. E. WARREN.

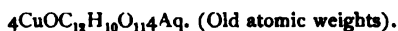
While definite standards of quality are provided for substances official in the U. S. Pharmacœpia, no definite standards are, as a rule, set for non-official substances. It is, therefore, particularly important that the non-

official products as found on the market be subjected to control. With this idea in view the Chemical Laboratory of the American Medical Association devotes some time to the examination of unofficial substances as they occur on the American market.

The employment of different processes by different makers for the manufacture of the same article naturally results in some variations in the appearance and quality of the finished product. These variations, however, should not exceed a reasonable limit either for standards of strength or for impurities which may unavoidably remain in the finished product.

Copper citrate, a substance occasionally used in medicine, may be taken as an example of the conditions which result from the lack of authoritative standards to guide the manufacturer in the preparation of his wares. Copper citrate, as employed in medicine, is a salt of citric acid in which the copper is present in the cupric state. Several citrates of copper have been described, but considerable confusion exists in the literature concerning the composition of the medicinal salt.

The chemical literature of copper citrate dates from 1833, when the salt appears first to have been prepared by Liebig* and his pupils while working out the formula for citric acid. They obtained the salt by heating a solution of copper acetate with a solution of citric acid. Gay-Lussac made an analysis of the salt and ascribed the following formula to it :



In 1843 Heldt studied a large number of the salts of citric acid. He prepared copper citrate † by heating a solution of copper acetate with citric acid. He also obtained the salt by heating copper carbonate with a solution of citric acid. From the results of an analysis of the salt which had been dried over sulphuric acid for 24 hours, he calculates the formula, $4\text{CuOC}_{12}\text{H}_{10}\text{O}_{11}3\text{H}_2\text{O}$ (old atomic weights). Heldt states that at 100 degrees the salt loses $\frac{2}{3}$ of its water of hydration, or 5.41 per cent., and at 150 degrees the whole of the water is lost, or 7.53 per cent. At 170 degrees decomposition takes place.

Kämmerer ‡ obtained copper citrate by heating a solution of sodium citrate with copper sulphate in great dilution, and also by adding citric acid to a hot solution of copper sulphate and potassium acetate. The product obtained by each process was analyzed, and the two salts were found to be identical. Somewhat later Kämmerer § obtained another copper citrate by dissolving copper carbonate in citric acid, filtering and

* *Annal. Pharm.*, 5, 134-5 (1833).

† *Annal. Chem. Pharm.*, 47, 193 (1843).

‡ *Annal. Chem. Pharm.*, 148, 303 (1868).

§ *Ibid.*, 170, 186 (1873).

precipitating the copper citrate by the addition of alcohol. The formula for this salt is said to be $\text{Cu}_3\text{H}_2(\text{C}_6\text{H}_4\text{O}_7)_3 + 15\text{H}_2\text{O}$.

The formula $\text{Cu}_2\text{C}_6\text{H}_4\text{O}_7 + 2\frac{1}{2}\text{H}_2\text{O} = \frac{1}{2}[\text{Cu}_4(\text{C}_6\text{H}_4\text{O}_7)_3 + 5\text{H}_2\text{O}]$ is given for copper citrate by Beilstein,* by Schmidt,† and is found in Merck's Index.‡ Hager§ gives the formula, $\text{Cu}_2\text{C}_6\text{H}_5\text{O}_7 + 2\frac{1}{2}\text{H}_2\text{O}$.

In the attempt to obtain more definite information concerning the composition of commercial copper citrate the examination of the market product was undertaken.

Four original packages of copper citrate bearing the labels of as many firms were purchased. These products varied somewhat in physical character and appearance. The specimen bearing the Merck label was a bright green powder, was noticeably gritty to the touch, and possessed a noticeable odor like acetic acid; Mallinckrodt's specimen was a pale bluish-green, odorless powder, slightly gritty to the touch. The specimen sold under the label of Powers, Weightman, Rosengarten Co., was a pale green odorless powder. In general appearance it was very similar to the P. W. R. specimen.

ANALYTICAL.

All of the specimens responded to tests of identity for copper and citrate. With the exception of the Merck specimen, which by its odor indicated the presence of acetic acid, all of the specimens gave tests for sulphates.

Water.—This was determined by heating in an air bath at 100°C . until an approximately constant weight was obtained. When the temperature was gradually raised to 150°C . some further loss was noted, but constant weight could not be obtained. At 100°C . a loss of from 5.4 per cent. to 6.7 per cent. was found for the different specimens. At 150°C . the highest observed loss was 7.6 per cent.

Results.—Merck brand; 0.8171 Gm. lost 0.0555 Gm., equivalent to 6.79 per cent.; 0.9493 Gm. lost 0.0637 Gm., equivalent to 6.71 per cent.; average, 6.75 per cent. water. * M. C. W. brand; 0.6534 Gm., lost 0.0360 Gm., equivalent to 5.51 per cent.; 0.7291 Gm. lost 0.0393 Gm.; equivalent to 5.35 per cent.; average, 5.43 per cent. water. P. W. R. brand: 0.5206 Gm. lost 0.0343 Gm., equivalent to 6.59 per cent.; 0.992 Gm. lost 0.0685 Gm., equivalent to 6.86 per cent.; average, 6.72 per cent. water. Squibb brand; 1.0024 Gm. lost 0.0676 Gm., equivalent to 6.74 per cent.; 1.0080 Gm. lost 0.0676 Gm., equivalent to 6.72 per cent.; average, 6.73 per cent. water.

Copper.—To 0.5 Gm. of the material 25 Cc. water and 10 Cc. normal

* Org. Chem., [3] 1, 838 (1893).

† Pharm. Chem., 2, 575 (1901).

‡ Merck's Index, 154 (1907).

§ Handbuch d. Pharm., Pr. Ergänz. Bd., 245 (1909).

sulphuric acid were added. The mixture was agitated, heated almost to boiling and maintained at that temperature until solution took place, a little more of the normal acid being added if necessary. After the solution had cooled, 10 Cc. of potassium iodide test solution were added, the mixture allowed to stand for five minutes with occasional shaking, 200 Cc. water added, and the liberated iodine titrated with tenth-normal sodium thiosulphate.

1 Cc. $\frac{N}{10}$ $\text{Na}_2\text{S}_2\text{O}_3$ = 0.00631 Gm. Cu.

The amounts of copper in the specimens examined varied from 34.1 per cent. to 35.2 per cent.

Results.—Merck brand; 0.4049 Gm. required 22.61 Cc. tenth-normal sodium thiosulphate, equivalent to 0.1427 Gm. copper, or 35.24 per cent.; 0.4019 Gm. required 22.42 Cc. tenth-normal thiosulphate, equivalent to 0.14147 Gm. copper, or 35.20 per cent.; average, 35.22 per cent. copper. M. C. W. brand; 0.4014 Gm. required 12.18 Cc. tenth-normal sodium thiosulphate, equivalent to 0.13994 Gm. copper, or 34.86 per cent.; 0.4007 Gm. required 22.18 Cc. tenth-normal sodium thiosulphate, equivalent to 0.13994 Gm. copper, or 34.92 per cent.; average, 34.89 per cent. copper. P. W. R. brand; 0.3062 Gm. required 16.57 Cc. tenth-normal sodium thiosulphate, equivalent to 0.10459 Gm. copper, or 34.15 per cent.; 0.5172 Gm. required 28.0 Cc. tenth-normal sodium thiosulphate, equivalent to 0.17665 Gm. copper, or 34.16 per cent.; average, 34.15 per cent. copper. Squibb brand; 0.3899 Gm. required 21.11 Cc. tenth-normal sodium thiosulphate, equivalent to 0.1332 Gm. copper, or 34.16 per cent.; 0.5585 Gm. required 30.15 Cc. tenth-normal thiosulphate, equivalent to 0.19024 Gm. copper, or 34.06 per cent.; average, 34.11 per cent. copper.

Sulphate.—A weighed quantity of the material was dissolved in diluted hydrochloric acid by the aid of heat, solution of barium chloride was added, and the barium sulphate collected and weighed in tared Gooch crucibles. The results were calculated to SO_4 and to crystallized copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). In the specimens containing sulphate as an impurity, sulphate equivalent to crystallized copper sulphate was found in amounts varying from 1.7 per cent. to 6.4 per cent.

Results.—M. C. W. brand; 1.5135 Gm. gave 0.0246 Gm. barium sulphate, equivalent to 0.01012 Gm. SO_4 , or 0.668 per cent.; 2.5340 Gm. gave 0.0409 Gm. barium sulphate, equivalent to 0.01683 Gm. SO_4 , or 0.664 per cent.; average, 0.666 per cent. SO_4 , equivalent to 1.73 per cent. crystallized copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). P. W. R. brand; 2.0963 Gm. gave 0.1203 Gm. barium sulphate, equivalent to 0.0495 Gm. SO_4 , or 2.36 per cent.; 2.0215 Gm. gave 0.1146 Gm. barium sulphate, equivalent to 0.047157 Gm. SO_4 , or 2.33 per cent.; average, 2.35 per cent. SO_4 , equivalent to 6.10 per cent. crystallized copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). Squibb brand: 1.2615 Gm. gave 0.0762 Gm. barium sulphate, equivalent

to 0.031356 Gm. SO_4 , or 2.49 per cent.; 1.6755 Gm. gave 0.1007 Gm. barium sulphate, equivalent to 0.04143 Gm. SO_4 , or 2.47 per cent.; average, 2.48 per cent. SO_4 , equivalent to 6.44 per cent. crystallized copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$).

Citric Acid.—An attempt was made to determine citric acid by precipitation of the copper as sulphide, expulsion of the hydrogen sulphide from the filtrate by boiling, and titration of the acid with normal alkali. In this process any copper sulphate present as an impurity would of course be converted into sulphuric acid and similarly any copper acetate into acetic acid.

A weighed quantity of the substance was dissolved in 50 Cc. of 5 per cent. neutral sodium citrate solution by the aid of heat, the mixture diluted to 75 Cc. with water, heated to boiling, and the copper precipitated with hydrogen sulphide. The copper sulphide was filtered off, washed with hot water containing a little hydrogen sulphide, the filtrate boiled until odorless, and the acid titrated with normal potassium hydroxide, using phenolphthalein as indicator.* The sulphate (SO_4) present was calculated to sulphuric acid (H_2SO_4) and the amount of normal alkali necessary to combine with it deducted from the total alkali used. The remainder of the alkali was then calculated to percentage of citric acid radicle ($\text{C}_6\text{H}_5\text{O}_7$). The amount of citric acid radicle varied from 46.6 per cent. to 55.4 per cent. However, no determination of acetic acid was made in the specimen of Merck & Co., so that the acetic acid (present as copper acetate) is calculated as citric acid.

Results.—Merck brand: 1.2230 Gm. required 10.85 Cc. normal potassium hydroxide, equivalent to 55.45 per cent. citric acid radicle ($\text{C}_6\text{H}_5\text{O}_7$); 1.0469 Gm. required 9.28 Cc. normal potassium hydroxide, equivalent to 55.41 per cent. citric acid radicle; average, 55.43 per cent. citric acid radicle. M. C. W. brand: 0.8651 Gm. of the material required 7.71 Cc. normal potassium hydroxide; 0.8651 Gm. contains sulphate equivalent to 0.12 Cc. normal potassium hydroxide; 7.71 Cc. normal potassium hydroxide — 0.12 Cc. = 7.59 Cc. normal potassium hydroxide required to combine with the citric acid, equivalent to 54.87 per cent. citric acid radicle; 1.1387 Gm. of the material required 10.127 Cc. normal potassium hydroxide; 1.1387 Gm. contains sulphate equivalent to 0.159 Cc. normal potassium hydroxide; 10.127 Cc. normal potassium hydroxide — 0.159 Cc. = 9.968 Cc. normal potassium hydroxide required to combine with the citric acid present, equivalent to 54.74 per cent. citric acid radicle; average, 54.80 per cent. citric acid radicle. P. W. R. brand: 1.0036 Gm. of the material required 7.974 Cc. normal potassium hydroxide; 1.0036 Gm. contains sulphate equivalent to 0.494 Cc. normal potassium hydroxide; 7.974 Cc. normal potassium hydroxide — 0.494 Cc. = 7.48 Cc. normal

* The method is open to the objection that the copper sulphide does not invariably filter out readily, thus causing delay and possible oxidation to sulphuric acid.

potassium hydroxide required to combine with the citric acid, equivalent to 46.61 per cent. citric acid radicle; 1.0010 Gm. required 7.93 Cc. normal potassium hydroxide; 1.0010 Gm. contains sulphate equivalent to 0.492 Cc. normal potassium hydroxide; 7.930 Cc. normal potassium hydroxide — 0.492 Cc. 7.438 Cc. normal potassium hydroxide consumed by the citric acid radicle, equivalent to 46.55 per cent. citric acid radicle; average, 46.58 per cent. citric acid radicle. Squibb brand: 0.4701 Gm. of the material required 3.765 Cc. normal potassium hydroxide; 0.4701 Gm. contains sulphate equivalent to 0.244 Cc. normal potassium hydroxide; 3.765 Cc. normal alkali — 0.244 Cc. = 3.521 Cc. normal potassium hydroxide required to combine with the citric acid, equivalent to 46.84 per cent.; 0.632 Gm. of the material required 5.05 Cc. normal potassium hydroxide; 0.632 Gm. contains sulphate equivalent to 0.328 Cc. normal potassium hydroxide; 5.05 Cc. normal potassium hydroxide — 0.328 Cc. = 4.722 Cc. normal potassium hydroxide consumed by the citric acid, equivalent to 46.72 per cent. citric acid radicle; average, 46.78 per cent. citric acid radicle.

The analytical results are tabulated below. In the second table the sulphate (SO_4) is calculated to copper sulphate ($\text{CuSO}_4 + 5\text{H}_2\text{O}$), and the amount of copper contained in it is subtracted from the total, thus giving the copper combined as citrate.

I.

Brand.	H_2O (Loss at 100°).	Total copper.	SO_4 .	Citric acid radicle ($\text{C}_6\text{H}_8\text{O}_7$).	Remarks.
Merck	6.75	35.22		55.43*	Contains acetate.
M. C. W.	5.43	34.89	0.66	54.80	
P. W. R.	6.72	34.15	2.35	46.58	
Squibb	6.73	34.11	2.48	46.78	

II.

Brand.	† Cryst. copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$).	Copper in copper sulphate.	Copper in copper citrate.
M. C. W.	1.73	0.44	34.45
P. W. R.	6.10	1.55	32.60
Squibb	6.44	1.64	32.47

* No determination of acetic acid was made in this specimen, hence the acetic acid present as acetate is here calculated as citric acid.

† Calculated from SO_4 .

While our investigation is not sufficiently extensive to determine the formula for copper citrate as found on the market it seemed worth while to compare our findings with the published formulas.

The normal copper citrate of theory $\text{Cu}_2(\text{C}_6\text{H}_5\text{O}_7)_2$ requires 1 1-2 molecules of copper to 1 equivalent of the acid radicle. This relation by weight is as 1 to 1.98.

In the salt, " $\text{Cu}_2\text{C}_6\text{H}_5\text{O}_7$," of the literature, having 2 molecules of copper to 1 of the organic radicle, the relation is as 1 to 1.48; while in the salt prepared by means of alcohol (Kämmerer) this relation is as 1 to 1.78. In the salts which we have examined this relation is expressed by the following figures: M. C. W., 1 to 1.53; P. W. R., 1 to 1.43; Squibb, 1 to 1.44. Since the specimen of Merck & Co., contains acetate which was not determined, the relation of copper to citric acid could not be calculated. An examination of the tabulated results shows that copper citrate of the market varies considerably in composition, and demonstrates the need for the adoption of some standard defining the limits for impurities.

After these examinations were completed the essential findings for each specimen were submitted to the manufacturer interested together with an offer to examine a specimen submitted directly by the manufacturer.

E. R. Squibb & Sons replied that they no longer listed the product.

Merck & Co., replied: "A negligible amount of Acetate is always present in this salt." A specimen sent by this firm was found to contain 34.9 per cent. total copper and acetic acid* equivalent to 1.06 per cent. copper acetate $[\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 + 5\text{H}_2\text{O}]$. Upon drying at 100°C . the specimen lost 5.3 per cent. of its weight.

Results.—Loss at 100°C .; 0.5012 Gm. of the material lost 0.0272 Gm., equivalent to 5.43 per cent.; 0.5014 Gm. lost 0.0262 Gm., equivalent to 5.21 per cent.; average, 5.32 per cent.

Copper.—0.5993 Gm. of the material required 33.17 Cc. tenth-normal sodium thiosulphate, equivalent to 34.91 per cent. copper; 0.7055 Gm. required 39.05 Cc. tenth-normal sodium thiosulphate, equivalent to 34.93 per cent. copper; average, 34.92 per cent. copper.

Acetate.—The distillate from 5.2896 Gm. required 5.48 Cc. normal potassium hydroxide, equivalent to 0.05429 Gm. copper acetate $[\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{H}_2\text{O}]$, or 1.03 per cent.; the distillate from 5.3050 Gm. required 5.92 Cc. tenth-normal potassium hydroxide, equivalent to 0.05864 Gm. copper acetate, or 1.10 per cent.; average, 1.06 per cent. copper acetate.

* Acetic acid was determined as follows: Five grams of the material were placed in a distillation apparatus, 100 Cc. normal sulphuric acid added and the mixture distilled to about 20 Cc.; 200 Cc. distilled water were then added, and the distillation repeated. The distillates were then united and titrated with tenth-normal potassium hydroxide using phenolphthalein as indicator, and the acetic acid found calculated to copper acetate.

1 Cc. $\frac{N}{10}$ KOH = 0.009907 Gm. $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{H}_2\text{O}$.

A specimen sent by the Mallinckrodt Chemical Works, and which was said to represent the product which that firm now sells, was found to contain 2.7 per cent. of water, 35.6 per cent. of copper, 55.5 per cent. citric acid radicle, and to be free from sulphate. This demonstrates that sulphate is not an unavoidable impurity in commercial copper citrate.

Results.—Loss at 100° C. : 1.0022 Gm. of the material lost 0.0271 Gm., equivalent to 2.70 per cent. ; 1.0009 Gm. lost 0.0268 Gm., equivalent to 2.68 per cent. ; average, 2.69 per cent. loss at 100° C.

Copper.—0.4146 Gm. of the material required 23.41 Cc. tenth-normal sodium thiosulphate, equivalent to 0.14774 Gm. copper, or 35.64 per cent. ; 0.4006 Gm. required 22.54 Cc. tenth-normal sodium thiosulphate, equivalent to 0.142204 Gm. copper, or 35.50 per cent. ; average, 35.57 per cent. copper.

*Citric Acid Radicle.**—1.0005 Gm. of the material required 29.046 Cc. normal potassium hydroxide ; 29.046 Cc. normal hydroxide —20 Cc. (the amount required to neutralize the added acid) = 9.046 Cc. normal alkali necessary to combine with the citric acid present. This is equivalent to 56.55 per cent. citric acid radicle. 1.0040 Gm. required 29.046 Cc. normal potassium hydroxide (9.046 Cc. consumed by the citric acid present), equivalent to 56.35 per cent. citric acid radicle ; average, 56.45 per cent. citric acid radicle.

Powers, Weightman, Rosengarten Co. replied that they no longer had in stock any specimens of the particular lot which was examined in the Association laboratory. They reported that a specimen taken directly from their stock contained much less sulphate than the specimen examined in the Association laboratory. A specimen sent by this firm lost 6.3 per cent. of its weight at 100° C., contained 1.2 per cent. SO_4 and 34.1 per cent. copper.

Results.—Loss at 100° C. : 1.0053 Gm. of the material lost 0.0642 Gm., equivalent to 6.32 per cent. ; 1.0043 Gm. lost 0.0626 Gm., equivalent to 6.23 per cent. ; average, 6.28 per cent. loss.

Sulphate.—2.0051 Gm. of the material gave 0.0576 Gm. barium sulphate, equivalent to 1.19 per cent. SO_4 ; 2.0001 Gm. gave 0.0579 Gm. barium sulphate, equivalent to 1.18 per cent. SO_4 ; average, 1.19 per cent. SO_4 , equivalent to 3.08 per cent. crystallized copper sulphate ($\text{CuSO}_4 + 5\text{H}_2\text{O}$).

Copper.—0.3827 Gm. of the material required 20.58 Cc. tenth-normal sodium thiosulphate, equivalent to 0.12986 Gm. copper, or 33.94 per cent. ; 0.3205 Gm. required 17.36 Cc. tenth-normal sodium thiosulphate,

* As the copper sulphide when precipitated from this specimen by the method previously described could not be readily filtered, the method was slightly modified in order to obviate this difficulty. The weighed sample was dissolved in 20 Cc. of warm, normal sulphuric acid (instead of sodium citrate solution) and the determination completed as previously described, allowance being made in the calculation for the acid added.

equivalent to 0.10954 Gm. copper, or 34.19 per cent. ; average, 34.06 per cent. copper.

The results obtained in the examination of the several specimens procured directly from the manufacturers, are summarized in the accompanying table :

Brand.	Water (Loss at 100° C.).	SO ₄ .	Total copper.	Copper acetate.	Citric acid radicle (C ₆ H ₅ O ₇).
Merck	5.32	0	34.92	1.06	
M. C. W. . .	2.69	0	35.57	0	56.45
P. W. R. . .	6.28	1.19	34.06	0	

While it is conceded that the entire absence of impurities cannot be demanded in commercial copper citrate, yet there is a product on the market which meets all reasonable requirements for purity. In view of this and in view of the variability in the purity of copper citrate as shown by the several examinations, the following provisional standards for purity and strength are recommended for the product :

Copper citrate should contain copper equivalent to from 34 to 36 per cent. of metallic copper.

If about 1 Gm. of copper citrate be dissolved in 20 Cc. of diluted hydrochloric acid, the solution diluted to 200 Cc. with hot distilled water, the mixture saturated with hydrogen sulphide, filtered, and the filtrate evaporated nearly to dryness on the water-bath, the residue should respond to the usual tests for citric acid.

If 0.5 Gm. of copper citrate be dissolved in 10 Cc. of diluted hydrochloric acid and 1 Cc. of barium chloride test solution be added, no turbidity should at once occur (limit of *sulphate*).

A solution of 0.5 Gm. of the salt in 10 Cc. of diluted sulphuric acid should not evolve any odor of acetic acid when boiled.

The salt should be free from nitrates, chlorides and carbonates.

Chemical Laboratory of the American Medical Association.

THE CHAIRMAN: These papers are now before you for discussion. If no comments are to be made, we will pass on to the next one.

MR. BERINGER: Mr. Chairman, the Committee on the U. S. Pharmacopœia have presented their report to the Section, in which are a number of principles to be acted upon. Action on those principles was delayed until copies were made. These copies are now here. I move that the recommendations offered by the Committee, and submitted at a previous session of this Section, be now approved by this Section, for adoption by the General Association.

The motion having been duly seconded was discussed at considerable length by Messrs. Stevens, Turner, Lyons, Eldred, Beringer, Dohme, Puckner, Vanderkleed, Kraemer and Kelly, and upon being put to a vote was declared lost.

MR. KRAEMER: I now move that these General Principles be referred back to the General Association, from this Section, without endorsement.

MR. TURNER: If I understand it right, these did not come from the General Session, but from a committee.

MR. BERINGER: My understanding is this: that the Committee on the Pharmacopœia is a committee of the whole body, but this report was referred to the Scientific Section for consideration. If the American Pharmaceutical Convention does not send its recommendations to the Convention, there will be no outline for discussion. Now if we can agree upon some general lines, we ought to do it. That is the sole reason the Committee had for shaping up these recommendations.

THE CHAIRMAN: I think the motion made by Mr. Kraemer is quite logical, and is the correct one. It is evident that we, as members of this Section can not agree on this material as presented. This is presented by a Committee that was appointed by the Association to consider such matters, and coming from that Committee, as the consensus of opinion of its members, it will have just as much weight in the Pharmacopœial Convention as if it came with the endorsement of the Association back of it. And after all is said and done, the Committee of Revision is entrusted with the revision of the Pharmacopœia, and must act in accordance with their best judgment. If we refer these principles without endorsement to the general session, the general session will no doubt refer them to our delegates to the convention, and the delegates to the convention will then present them as the consensus of opinion of the ten men who have been specially appointed to consider this particular question; and they will receive the consideration that is rightfully due to them.

MR. KRAEMER: That report has already been received by the Association in general session, and has been referred to this Session for technical discussion. Now we say as a Section we appreciate the work that has been done on this thing, but we can not agree on certain details, and we refer the matter back to the general session to do with it as it sees fit. It is simply an opinion that the experts do not agree on these things—not that the report will not have its due weight. There is no slur intended—nothing of the sort.

MR. SCOVILLE: I think this Section ought to understand one thing, and that is, that in all probability any report of this kind would be referred simply in blank to the Revision Committee. At the last session of the convention there were a number of such reports sent in, and they were all acted on just in that one way. If the convention were to consider all such reports that came before it, they would be in session for a year. They will entertain nothing but direct motions from their delegates. Nothing but a direct motion in writing from a delegate will probably be entertained by this convention: and this is not a direct motion, and can not be received as such; it comes in too many forms for a single motion. The Revision Committee, however, will consider and report on this question—but not, I think, the convention.

THE CHAIRMAN: The question has been called for; and the question, as the Chair understand it, is that the report of the U. S. P. Committee be referred back to the general session, without recommendation.

Motion carried.

THE CHAIRMAN: We will now resume the presentation of the papers; and the next one on the program is Dr. Roberts' paper on "A New Rack for Holding Separatory Funnels." Dr. Roberts is not here, so we will pass on to the next paper, which is by Mess. Engelhardt and Schmidt, and on the subject of "Scammony Resin."

By request Mr. Dohme read the paper.

SCAMMONY AND RESIN SCAMMONY.

BY H. ENGELHARDT AND M. R. SCHMIDT.

Considerable work has recently been done on the chemical and physical properties of the several substances generally classed as scammony resins. Guiges, * Cowie, † and Taylor ‡ have made important contributions to our knowledge of these bodies, but it appears that the end is not yet reached.

The whole subject is more complicated than would appear at first sight, and great confusion exists, especially in the minds of dealers, as to what is covered up by the terms scammony and resin scammony.

The U. S. P. recognizes as official two substances, scammony, which is the exudate obtained by incising the living root of *Convolvulus Scammonia*, and resin scammony, which is prepared by extracting scammony with alcohol, precipitating the resin with water, and drying at a gentle heat.

The French Codex recognizes the same substances.

The British Pharmacopœia, on the other hand, describes virgin scammony, resin scammony and scammony root; the virgin scammony as used without further purification, and the resin scammony is made by extracting scammony root with alcohol. Consequently resin scammony of the British Pharmacopœia is not necessarily identical with resin scammony of the U. S. P. or the French Codex.

Of late years there has appeared on the market another substance, the so-called Mexican scammony, prepared by extracting the root of *Ipomea orizabensis*. This substance is not yet official in any of the pharmacopœias.

The subject is further complicated by the difficulty of procuring authentic samples. The dealers frequently confuse names, and judging by our analytical results, substitution very often takes place. As an example, one lot of root shipped as genuine Mexican scammony was labeled "*Convolvulus Scammonia*, Mexican," which is of course contradictory.

* Journ. de Ph. et de Ch. (6) 11; 629 (1909). *Ibid.*, (6) 22; 24 (1905). *Ibid.*, (6) 24, 404, 444, 498, (1905). Bull. Soc. Chim., 872, (1908).

† Trans. Brit. Pharm. Conf., 1908; 457, 462. Pharm. Journ., Dec. 25, 1909.

‡ Am. Journ. Pharm. Vol. 81, 105, (1909).

The work of Guiges dealt principally with the solubility of scammony resin in ether and the optical rotation. He found that some scammony resins were partly insoluble in ether, while the resin from *Ipomea orizabensis* is completely soluble in ether and can be used to adulterate true scammony, a statement, which, as will be shown later, is incorrect. He also called attention to the necessity of using ether of a definite degree of hydration and alcohol percentage when determining the solubilities.

As regards the optical rotation, for resin extracted from the gum resin (scammony) Guigues found a maximum specific rotation of -24.5° . For resin extracted from the root, the rotation varied from -18.5° to -23.5° .

The work of Cowie showed that the saponification value is a simple and accurate means of distinguishing true scammony resin from Mexican resin. Cowie also studied the solubility in ether.

Taylor has also made a rather extended study of the acid and saponification numbers, ether solubility, and iodine numbers of various scammony resins. According to his statement, however, all these resins were prepared by extracting the root with alcohol, and hence none of them can be regarded as U. S. P. products.

Cowie does not give any details as to the history of most of his resins, but it appears that most of them were commercial samples, or purified resins obtained from commercial articles. If his resins were prepared by purifying virgin scammony, they would come under the class of the U. S. P. resin scammony, but would not be official in the British Pharmacopœia, and vice versa, if they were made by extracting the drug, they would be official in the British Pharmacopœia and not in the U. S. P. This instance shows the difficulty of arriving at definite conclusions in these matters.

The chief result of Taylor's and Cowie's work has been to show that the saponification values for resins from *Convolvulus Scammonia* range around the number 238, while the saponification values of the resins obtained from the Mexican root are generally less than 190. Taylor, using U. S. P. ether, found that both the Mexican and true scammony resins, with the exception of one sample, were at least 99 per cent. soluble in ether. This does not agree with the statement of Cowie, who finds that true scammony resin is soluble from 96.4 to 100 per cent. in ether of a sp. gr. of 720, while three samples of the Mexican resins were dissolved only to the extent of 68.6 to 72 per cent. Cowie has directed attention to the varying solubility which will be found if the ether used in the different determinations is not perfectly uniform in quality. This fact may account for the discrepancies between Taylor's and Cowie's results. A more detailed discussion of this point will be taken up later.

The resins examined in this work were all purified according to the U. S. P. method, *i. e.*, extracting with boiling alcohol, with precipitation of the concentrated extract by water and subsequent drying. In order to

insure more perfect drying, without the danger of overheating, all our resins were dried in the following manner. After thorough washing, the resinous mass was freed from inclosed water by stirring and draining. It was then dissolved in alcohol, filtered, and the alcoholic solution evaporated to a thick syrup, which was then poured on thin sheets of glass and dried at a temperature slightly below 100° C. The results show that the moisture content of resins dried in this way is no less than is found in those which have been dried by other methods. The alcohol was certainly eliminated, but it appears that a temperature above 100° C. is necessary to remove the water entirely. The U. S. P. direction to dry at "a gentle heat" therefore seems inadequate.*

The moisture determination was made by heating the powdered resin on a watch glass for one hour at 110° to 115° C. Our results are practically identical with those of Cowie and Taylor, and the same is true of the percentages of ash.

The determination of the acid number often offers considerable difficulty, on account of the dark color which the solution assumes almost immediately after the addition of any alkali. Recourse was finally had to the method of Marx: † 2 Gm. of the powdered resin are dissolved in a large flat-bottomed porcelain dish in about 100 Cc. of neutral alcohol and the titration made with $\frac{1}{2}$ normal alcoholic potash and phenolphthalein. The solution of the resin is thus brought against a white background, in a thin layer, which facilitates the determination of the end point. Even with this aid, however, the determination is not always satisfactory, and little confidence can be placed in the accuracy of the results. An attempt to use $\frac{N}{4}$ barium hydrate solution was unsuccessful, since the color developed, if anything, was darker than that caused by the potassium hydroxide.

The saponification values were determined in the usual way, using $\frac{N}{2}$ caustic potash.

Ether solubilities were determined in both commercial and anhydrous ether. The commercial ether had a sp. gr. of .7182 at 25° C., while the anhydrous ether had a sp. gr. of .7106. It will be noted, as Cowie has already pointed out, that the ether solubility varies with the nature of the ether used.

A rather extended study of the iodine numbers was made. The method by Huebl was applied at first, but it was found to be impossible to obtain concordant results by it. The iodine numbers varied in some cases 100 per cent. when the different tests were allowed to stand for different lengths of time. Moreover, no definite end point could be found when titrating the excess of iodine with sodium thiosulphate and starch indicator. The

* The French Codex directs 45° C.

† Chem. Ztg., No. 16, 1910.

solution continually became blue within ten seconds after being decolorized, and this often continued during the addition of 3 to 5 Cc. of thio-sulphate. This method was finally given up and the determinations were made according to the method of Wijs.* This method has proven itself to be so satisfactory that we can recommend it most highly, at least when working with these resins. The solution is prepared as follows: 9 grammes of powdered iodine are dissolved by the aid of heat in 500 Cc. of glacial acetic acid. Chlorine gas, washed through water, and dried by sulphuric acid, is then passed into the solution, using a capillary tube to insure more complete absorption. Thus the iodine is converted into iodine monochloride. The completion of the reaction is shown by the sudden disappearance of the dark brown color of the solution, and this end point is very easily seen. About $\frac{1}{6}$ of a gram more of iodine is added, until the dark color of the solution is partly restored. This is done to prevent the solution containing an excess of chlorine. To make a determination, one gram of the powdered resin is put into a glass-stoppered 200 Cc. bottle, 10 Cc. of redistilled carbon tetrachloride free from carbon disulphide or oxidizable substance are added, and 25 Cc. of the iodine monochloride solution. After standing for one hour in the dark 20 Cc. of 10 per cent. potassium iodide solution are added and 50 Cc. of distilled water, and the excess of iodine titrated back in the usual way. The end point is very sharp and there is very little tendency for the blue color to reappear. One sample which was allowed to stand for 15 hours required only 0.3 Cc. more of tenth-normal thiosulphate solution to titrate the iodine which had separated.

The iodine numbers obtained by Wijs's method were in every case higher than those obtained by Huebl's method, even when the latter solutions were allowed to stand for 24 hours. Blank determinations are unnecessary with Wijs's method. The equivalent of 25 Cc. of the solution in terms of sodium thiosulphate solution is determined once for all, and the solution is so stable that subsequent blanks therefore are not necessary. The solution of iodine monochloride can be prepared in $\frac{1}{2}$ hour, and for most oils and fats from 15 to 40 minutes is sufficient time for complete absorption of the iodine. The behavior of the scammony resins towards Huebl's solution led us to consider one hour as the minimum time necessary, but it may be said that no difference was found when the absorption was continued for $\frac{1}{2}$ hour longer.

The optical rotations were determined with the decolorized resin in the following way: about 4 Gm. of the resin were dissolved in about 50 Cc. of alcohol, water added almost to turbidity, and the solution boiled for one hour with about 2 Gm. of animal charcoal using a reflux condenser.

* Berichte, 31; 750 (1898) Chem. Rev. Fett. u. Harz-Ind., 6; 5.

See also the excellent article by Harvey, Journ. Soc. Chem. Ind. 21; No. 23, 1137- (1902).

After settling, the solution is cooled, and the liquid poured through a filter. A second treatment with animal charcoal generally suffices to give a solution which is almost colorless. After filtering 10 Cc. of this solution are removed by a pipette to a small tared beaker, evaporated to dryness, dried at 110° C. and weighed. Another portion of the solution is polarized in a 10-Cm tube.

In order to confirm the results of previous observers, and to orient ourselves regarding virgin scammony and Mexican scammony resin, the specimens marked I, II, III, and IV in the tables were prepared. Number I came to us labeled "Virgin Scammony, elect." In its physical appearance it agreed with the descriptions given in the text-books. It was of a greenish-brown color, very brittle, and its luster would have been classed as subresinous in mineralogy, since the fracture was almost without gloss. It was also of a granular or porous texture. No gross impurities were visible, such as pebbles, woody matter, etc. In our opinion, this sample was actually the exudate from *Convolvulus Scammonia*, which had possibly been freed from coarse impurities by fusing and straining.

A purified resin obtained by extracting a portion of I with alcohol, precipitating with water, etc., constitutes specimen II. Number II presented an appearance entirely different from I. It was of a yellowish-brown color, semi-transparent, not very odorous, and its luster was markedly resinous.

III was prepared by percolating a lot of root which had been labeled "True Scammony Root." Microscopic examination bore out this statement.

IV was obtained by percolating a lot of drug identified as *Ipomea orizabensis*.

These samples were compared with three products marketed under the names of virgin scammony and scammony resins. Specimen V was labeled "Scammony Resin Virgin." Its appearance was totally different from that of I, its luster was perfectly resinous, its color dark brown and instead of being porous the pieces were perfectly homogeneous like ordinary resin. Its odor, moreover, was cheese-like. Judging from its appearance, and more especially from its physical and chemical constants, this sample was wrongly labeled. Before use it was purified in the usual way.

Specimen VI was labeled "True Scammony Resin," and in general appearance was identical with V. This sample had also been misbranded.

Sample VII was labeled "Resin Scammony." In its appearance it was like V and VI, but its odor was slightly like pepper. It was examined both in the ordinary state in which it was received, and after having been purified, the purified sample constituting specimen VIII. The results show that it was also made from the Mexican Root, and was therefore wrongly labeled.

The following results were obtained and are arranged in three tables.

Table I includes moisture, ash, acid, saponification and ester numbers. As stated before, the moisture content of these resins was not reduced by the method of drying adopted by us. The results agree perfectly with those found by Cowie and Taylor and no further comment is necessary, except to call attention to the high percentage of moisture in the commercial samples I and VII.

The percentage of ash is rather constant, and in all cases except I is well below the limit of 1 per cent. allowed by the U. S. P. for resin scammony. The percentage of ash found in I is also below the limit of 3 per cent. allowed by the U. S. P. for virgin scammony; this high percentage of ash confirms our belief that the resin had been only superficially purified by straining from gross impurities.

Nothing definite can be concluded from the acid numbers, as has already been stated by Taylor and Cowie. The saponification numbers, on the other hand, fall into two well-defined groups; I, II, III have saponification numbers which are considerably over 200. II, which may be taken as a representative sample of purified virgin scammony, has the value 236.6 which is in close agreement with the average of about 238 found by Taylor, Cowie and others. The saponification value of the other five samples range within narrow limits around the number 177, which is lower than the average saponification value obtained by Taylor and Cowie.

Table II shows the solubility in various solvents. The most important results are the solubilities in ether. Cowie and Guiges have, as already stated, directed attention to the necessity of using anhydrous ether in determining the solubility, and their results are fully confirmed by the present work.

Sample I, the most impure specimen of all, was soluble to the extent of 71.8 per cent. in dry ether but to the extent of 85 per cent. in commercial ether, thus passing the requirements.

Sample II, the purified resin prepared from I, was entirely soluble both in anhydrous and commercial ether. III was soluble to the extent of 96 per cent. in commercial ether, and by stretching the words "almost completely" might have passed muster as the U. S. P. article, although it was prepared by percolating scammony root. The other five specimens vary between 80 per cent. and 90 per cent. soluble in anhydrous ether. In this connection we must call attention to the phenomenon always noticed when dissolving Mexican scammony in ether. Using U. S. P. ether, containing varying amounts of water and alcohol, a part of the resin invariably separates as a varnish on the walls of the vessel. This does not take place with resin made from scammony or from scammony root, and this appearance can be used to detect Mexican scammony in the presence of a considerable quantity of true scammony resin. Using anhydrous ether, the insoluble portion assumes a granular form which on standing settles to the bottom as a sticky mass.

The portion insoluble in chloroform was generally gelatinous and rather dark in color.

We have already spoken of the difficulty encountered in determining the iodine numbers by the method of Huebl. For example, sample II after being allowed to stand for 4 hours gave an iodine number of 5.5; after standing for 15 hours this value had risen to 8.8 and another test which was allowed to stand for 24 hours showed only 8.22. Sample V, with Huebl's method gave 8.33 after five hours and 10.58 after fifteen hours, while the same resin by Wijs's method gave 11.6 in one hour. The average of our iodine values is slightly greater than the average of Taylor's. As can be seen from the tables, no definite relation exists between the variety of resin and the iodine value, and this method can not be used as a means of differentiating the resins. We wish, again, however, strongly to recommend the method of Wijs. It is convenient, rapid and accurate, duplicate determinations agree well, the end point is sharp, and work is considerably lessened by the fact that the solution is stable and blanks are unnecessary for each determination. The solution should be kept in a dark bottle, otherwise the acetic acid is likely to be substituted by the halogens and the solution will lose in strength.

The specific rotations also fall into two distinct groups. The values found for the resins known to be derived from *Convolvulus Scammonia* are close to 24° while those for the Mexican resins are all over 31° . Guiges, as mentioned before, was the first one to call attention to this fact. Our value of -25.98° for sample I is slightly higher than his maximum of -24.5° obtained for a specimen prepared in an identical manner, and our value of -24.24° for sample III is slightly higher than his limit of -23.5° for resin extracted from the true root. These determinations can be made with a considerable degree of accuracy, and the optical rotations furnish a valuable means of distinguishing the true and false resins. The specific rotation of the Mexican resin approaches the specific rotation of resin jalap, but the high price of resin jalap would prevent any adulteration of Mexican resin with the former.

It is a well-known fact that virgin scammony is getting to be a scarce article and it is practically impossible at the present time to obtain any quantities of the authentic substance. Moreover, all the work that has been done so far goes to show that the resin prepared by extracting the root of *Convolvulus Scammonia* is practically identical with resin scammony prepared according to the U. S. P. directions from virgin scammony. We would suggest, therefore, if resin scammony is to be retained in the Pharmacopœia that the Revision Committee make the resin extracted from the root official, as has been done in the British, Belgian and Italian Pharmacopœias. On the other hand, if it can be shown by physiological experiments that the Mexican resin is identical in its action with true resin scammony, there seems to be no good reason why that cheap and abundant article should not replace the latter.

TABLE I.

Sample.	Moisture.	Ash.	Acid No.	Sap. No.	Ester No.
I.....	6.16	2.70	18.5	207.2	188.7
II.....	1.95	..	10.6	236.6	226.0
III.....	2.07	.21	16.3	256.2	239.9
IV.....	1.45	.20	10.2	175.8	165.6
V.....	2.25	.07	12.2	177.1	164.9
VI.....	2.23	.20	14.0	171.6	157.6
VII.....	4.29	.30	13.6	183.8	170.2
VIII.....	2.03	.15	14.9	175.9	161.0

TABLE II.

Sample.	Soluble in Abs. Ether.	Soluble in U. S. P. Ether.	Soluble in Chloroform.	Soluble in Alcohol.
I.....	71.8	85	82.1	90.6
II.....	100	100	100	100
III.....	93.9	96.0	100	100
IV.....	89.4	84.1	98.0	100
V.....	90.2	85.5	98.9	100
VI.....	88.3	80.9	96.1	100
VII.....	89.6	82.0	96.9	100
VIII.....	90.4	91.5	97.4	100

TABLE III.

Sample.	Iodine No.	Specific Rotation, Degrees.
I.....	11.69	—25.98
II.....	10.45	—24.97
III.....	17.83	—24.24
IV.....	11.60	—32.78
V.....	11.48	—33.80
VI.....	13.93	—34.27
VII.....	12.46	—31.31
VIII.....	11.65	—31.83

THE CHAIRMAN: We have two papers here by Albert Schneider, one entitled "Some Nauseous and Otherwise Objectionable Chinese Drugs Imported into the United States;" and the other on the subject of "Adulteration of Vegetable Drugs." Mr. Schneider not being present, we will pass those papers, reading them simply by title.

This appears to bring us to the end of our business for this session; and if no member has any additional communications to present we will proceed to the next order of business, and install the officers—who are already in their respective positions, and to whom we will entrust the business for the ensuing year. I thank you, gentlemen, for your co-operation. I will now entertain a motion to adjourn.

MR. C. E. CASPARI: Before we adjourn, I think it is more than due the officers of this Section, for the brilliant way in which they have disposed of the very large number of papers, that this Section give them a sincere vote of thanks; and I make that motion.

MR. KRAEMER: I want to second that motion. I have always taken a special delight in the Scientific Section and regard it as the backbone of this Association. There was a time when it was thought the one might be the ruin of the other. I think this year

the multiplicity of papers before this Section has shown that this Section can hold its own.

MR. C. E. CASPARI: I suggest that Mr. Puckner put the motion for a vote of thanks to the officers.

MR. PUCKNER: Gentlemen, you have heard the motion, that a vote of thanks be extended to the Officers of the Section, for their very efficient work; all in favor of that motion will say Aye. (Motion unanimously carried.)

On motion the Section here adjourned.

Papers read by title.

THE DISTRIBUTION OF ALKALOIDS BETWEEN IMMISCIBLE SOLVENTS AND ITS BEARING UPON ASSAY PROCESSES.

BY ATHERTON SEIDELL.

[Hygienic Laboratory, U. S. Public Health and Marine Hospital Service. Washington, D. C.]

Distribution studies which have been made upon a large number of substances have shown that the constancy of the coefficients of distribution disappears at great dilution. Furthermore, with substances which have different molecular weights in the two solvents the proportionality exists only between the amount dissolved as single molecules in the one solvent and the square root of the amount dissolved as double molecules in the other solvent. The distribution of alkaloids between immiscible solvents has so far as I am aware received slight attention, consequently the following determinations were made for the purpose of obtaining some little experimental data upon this interesting subject.

The question of the effect of the distribution of alkaloidal salts between the immiscible solvents used in assay processes is of little importance, since these fall in the category of electrolytes and it is well known that in the case of electrolytes the proportionality of distribution exists only for the undissociated molecules which are present, and since dilution increases the dissociation in the aqueous layer much more rapidly than corresponding to the decrease in concentration, the constancy of the ratio of distribution disappears. For instance, if a sufficiently dilute aqueous solution of an organic acid be shaken out with an immiscible solvent only slight traces will be removed although the acid may actually be more soluble in the solvent employed than in water.

A number of experiments made with benzoic acid illustrate this point very forcibly. Four Gm. of ammonium benzoate were dissolved in 200 Cc. of water and 50 Cc. of this solution were acidified with 10 Cc. $\frac{7}{1}$ H₂SO₄ and shaken out successively with 10 Cc. of carbon tetrachloride. The amounts of benzoic acid in terms of ammonium benzoate recovered by each extraction were as follows:

Extraction No.	Calc. Gm. $C_6H_5COONH_4$	Per cent. of total C_6H_5COOH entering CCl_4 layer at each extraction.
1	0.758	75.8
2	0.143	59.0
3	0.046	46.0
4	0.021	38.0
5	0.013	31.0
6	0.006	31.0
7	0.004	31.0

It therefore appears that the relative amount of benzoic acid entering the carbon tetrachloride layer diminishes very rapidly with decrease in concentration, and that after the fifth extraction each succeeding operation yielded less than one-third the total available benzoic acid, thus demonstrating the theoretical impossibility of extracting all the acid by means of carbon tetrachloride. Further experiments made by adding increasing weighed amounts of benzoic acid to cylinders each containing equal volumes of water and carbon tetrachloride and rotating at 25° for one day confirmed the above results. With the addition of 0.5 Gm. C_6H_5COOH to 10 Cc. of H_2O + 10 Cc. of CCl_4 , the amounts of acid in the H_2O and CCl_4 layers were as 5.84 is to 88.2, and when 0.1 Gm. C_6H_5COOH was used the ratio was as 13.4 to 83.0. The addition of acid to the aqueous layer resulted in diminishing the quantity of benzoic acid which it contained.

If now we consider the case of alkaloidal salts dissolved in water and shaken with immiscible solvents or as is customarily applied in practice, the extraction of alkaloids from organic solvents by shaking with dilute acid, we find that the conditions for a part of the alkaloidal salt remaining in the organic layer are even more unfavorable than with benzoic acid and carbon tetrachloride. The alkaloidal salts are for the most part easily dissociated and are furthermore extremely slightly soluble in the majority of the ordinary immiscible solvents, and therefore should remain wholly in the aqueous layer. In order, however, to obtain experimental confirmation of this point a series of determinations was made as follows:

Increasing weighed amounts (0.0060 to 1.000 Gm.) atropine sulphate, morphine sulphate and quinine bisulphate were placed in cylinders to which were then added equal volumes (15 Cc. each) of water and chloroform. After a two-day period of rotation at 25° a 10-Cc. portion of each chloroform layer was removed and evaporated to dryness in a weighing bottle, the residues calculated for the total of 15 Cc. of $CHCl_3$ varied in the case of atropine sulphate from 0.002 to 0.0003 Gm.; in the case of morphine sulphate from 0.0006 to 0.0010 Gm., and in the case of quinine bisulphate from 0.0001 to 0.0004 Gm. Thus a practically negligible amount was found in all cases.

Similar results were obtained a few years ago by A. Simmer (Arch.

Pharm. 244, 672-84) who, at the suggestion of Professor E. Schaer, of Strassburg, studied the behavior of alkaloidal salts towards immiscible solvents, especially chloroform. The experiments were made by shaking out aqueous solutions of the salts, acidified with definite amounts of acid with the solvents in question. Negligible amounts were obtained with the more basic alkaloids, but appreciable quantities with those less basic in character.

In the cases of the three salts employed in the preceding experiments the differences in their solubilities in water and chloroform are very great as illustrated by the following table prepared from the values quoted by the U. S. P. In this table the values for chloroform are not the reciprocals of the figures given in the Pharmacopœia, since it is probable, although not certain, that weight parts are there referred to, and in the present case the amount per given volume of chloroform is desired. The calculation to this basis has therefore been made for the three salts above named and also for strychnine nitrate.

Salt.	Gm. Alkaloidal Salt per 100 Cc.		$\frac{a}{b}$
	Water (a).	Chloroform (b).	
Atropine sulphate.....	263.0	0.238	1,104
Morphine Sulphate.....	6.54	insol.	—
Quinine Bisulphate.....	11.77	0.161	73.2
Strychnine Nitrate.....	2.38	0.347	2.5

Comparative experiments with strychnine nitrate which is relatively much more soluble in chloroform as compared with its solubility in water than either of the other three alkaloidal salts were made in the manner above described and the following results were obtained.

Cylinder. No.	Gm. Strychnine Nitrate Added per 15 Cc. H ₂ O + 15 Cc. CHCl ₃ .	Gm. Strychnine Nitrate Per 15 Cc.		$\frac{a}{b}$
		Upper Layer (H ₂ O). (a)	Lower Layer (CHCl ₃). (b)	
1....	0.005	0.0051	0.0030 (?)	—
2.....	0.225	0.0222	0.0042	5.3
3.....	0.125	0.1017	0.0243	4.2
4.....	0.625 *	0.3250	0.1698	2.0

These results show that although the distribution in the mixture of water and chloroform to which an excess of the salt was added is nearly equal to the ratio of the solubilities in the two solvents separately, with lowering of concentration the relative amount which enters the chloroform layer diminishes very rapidly.

The experiments which were made with alkaloids were carried out in

* This quantity of salt was more than enough to saturate both layers, consequently the excess remained undissolved between the two layers.

exactly the same manner followed for the alkaloidal salts, viz., increasing weighed amounts of alkaloid were placed in glass-stoppered cylinders, each containing 15 Cc. of water and 15 Cc. of Kahlbaum chloroform. The cylinders were rotated at 25° C. for two days and 10 Cc. portions of each of the upper layers and of each of the lower layers were evaporated to dryness at not over 60° C. in weighing glasses. The residues were dried in a vacuum desiccator containing concentrated sulphuric acid to constant weight. The amounts were calculated to grams per 15 Cc. of each layer. It will be noted that the sum of the amounts found in the two layers is slightly greater in most cases than the quantities originally added. The fact that pure alkaloids dissolved in chloroform gain in weight when evaporated, due probably to retained chloroform, has been known for some time and is no doubt the cause of the present discrepancies. These differences are in themselves of no great importance in the following experiments, since it is only the relative amounts actually present in equal volumes of the two layers which are of most interest. The results are as follows :

Cylinder. No.	Alkaloid.	Gm. Alkaloid Added per 15 Cc. H ₂ O + 15 Cc. CHCl ₃	Gm. Alkaloid recovered per 15 Cc.		
			Upper Layer (H ₂ O) (a)	Lower Layer (CHCl ₃) (b)	b a
1	Atropine	0.005	0.0010	0.0057	5.7
2	2 "	0.025	0.0021	0.0256	12.2
3	2 "	0.125	0.0049	0.1246	25.4
4	2 "	0.625	0.0160	0.6267	39.1
5	Strychnine	0.005	0.0006	0.0103(?)	—
6	"	0.025	0.0010	0.0253	25.2
7	"	0.125	0.0021	0.1299	61.0
8	"	0.625	0.0099	0.6225	64.0

The residues from the aqueous layers were tested with Mayer's and Wagner's alkaloidal reagents and found to give the characteristic reactions for alkaloids. It is therefore evident, as was to be expected, that a distribution which is out of all proportion to the ratio of the solubilities of the alkaloids in water and chloroform separately, does actually take place, and furthermore that with increasing dilution this disproportion is rapidly augmented. The individual solubilities of the two alkaloids as calculated from the values quoted by the U. S. P. have the following ratios :

	Gm. alkaloid per 100 Cc.		b a
	H ₂ O (a)	Chloroform (b)	
Atropine.....	0.222	94.75	426.4
Strychnine.....	0.01563	24.63	1,577.

In the present case we see that although atropine is really 426 times as soluble in chloroform as in water when determined separately ; with solu-

tions of approximately the concentration encountered in assays, the amount which goes into the chloroform layer may be only 12 to 25 times the amount remaining in the aqueous layer, thus giving the possibility of an error of 4 to 8 per cent. of the actual amount present. It will, of course, be objected that assay methods require repeated extractions with fresh portions of the immiscible solvent, but when it is remembered that the efficiency of each new portion of the solvent diminishes with the decrease in concentration, and furthermore that the time factor for reaching equilibrium during any one extraction is often not considered, and also that incomplete separation of the layers may occur, it is evident that these several sources of error are worthy of more consideration.

The fact that in distribution ratios we are dealing with spatial concentrations should certainly be emphasized in alkaloidal assays. The effect of a given 10 Cc. portion of chloroform is diminished directly in proportion to the volume of the aqueous layer which is being extracted. The question as to the advantages of many extractions with a small volume of the immiscible solvent as compared with a smaller number with a larger volume of the solvent should be studied.

Although the few experiments are not sufficient to use as a basis for many very broad conclusions in regard to the errors of the present-day assay processes which may be due to the distribution of alkaloids between immiscible solvents, they do call attention to the fact that this question is worthy of the very serious consideration of all who wish to develop alkaloidal assay methods to a higher state of perfection.

THE U. S. P. MELTING-POINT REQUIREMENTS.

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Among the many needs of revision in the U. S. P. few are more urgent and more important than the melting-point requirements. This assertion seems to me to be justified by many reasons. The very general use of the melting-point determination as a means of identifying and as a test for the purity of a compound, the great confidence that is usually placed by the rank and file of chemists in the melting-point determination for the purpose to which it is applied, and the possible simplicity and convenience of method that may be applied in the great majority of cases for the reasonably reliable determination of this constant, would seem to place the melting-point determination among the most important tests in the standardization of any class of pure chemical compounds—particularly organic compounds.

The present legal status of the U. S. P., however, demands that the various tests prescribed therein for the standardization of pharmacopœial products should be so refined as to insure reasonable agreement in the results obtained by different manipulators working independently upon the

same product; and such a demand is not too exacting if the U. S. P. standard is to command any respect.

Unfortunately the melting-point requirements as at present prescribed by the Pharmacopœia are deplorably incapable of any such degree of refinement—hence the imperative necessity for revision. In fact the whole subject of melting-points, in so far as any generally recognized or standard procedure is concerned, seems to be in a chaotic condition. An examination of the chemical and pharmaceutical literature in its bearing upon this subject will frequently disclose remarkable divergence—sometimes of astounding magnitude—in the values published as the melting-point of the same compound. Such a condition tends to undermine the confidence that the usual chemical or pharmaceutical training has taught most of us to feel in the reliability and simplicity of determinations of this constant. It also strikingly suggests the urgent need of a careful review and investigation of the subject of melting-points in general and particularly in application to the U. S. P. where, through the operation of the Pure Food and Drugs Law, a definite and dependable standard has become imperative.

The causes of divergence in the published melting-point values for the same compound are doubtless several. The principal cause, however, seems to consist in the great variety of methods and procedure used by different operators in making the determinations, including such associated details as rate of heating, stirring, emergent-stem correction, etc.,—the partial or complete regulation or neglect of which offers wide range of opportunity for variation in manipulation with more or less corresponding variation results. In almost every laboratory the method of procedure applied in determining this important constant differs in greater or less degree from that of every other laboratory.

Other factors which are more or less conducive to divergence in melting-point values involve variation in the physical condition of the compound, such as the degree of adherent moisture, the size of individual particles, and of course the amount, and probably the kind, of impurity.

That the use of different methods, and variation in physical condition constitute real causes of divergence in the results of melting-point determinations of the same compound has been conclusively demonstrated by the work of such investigators as Landolt,* Reissert,† Tyrer and Levy,‡ Pawloff,§ and others.

Another factor which it seems to me contributes in no small degree to the discord in this subject is the widely varying conception among different chemists as to what the melting-point really is. It is variously defined as that temperature at which it is just completely melted; or the mean

* Z. Physik. Ch., 4 (1889).

† Ber., 23 (2) (1890).

‡ Year Book of Pharm. and Trans. Brit. Pharm. Conf. (1889 and 1900).

§ R. Physik. Ch. (1908).

temperature of the range over which melting occurs. Some maintain that the term "melting-point" is misapplied, that it is purely theoretical, and that what we actually and invariably observe in practice is a melting range and not a melting-point.

In view of these facts it becomes a simple matter to point out the defects in the melting-point requirements of the present Pharmacopœia, and in a large measure at least, to suggest the remedy.

The Pharmacopœia prescribes no uniform method and procedure for the melting-point test. Each individual is free to select or devise whatever method may suit his fancy—a liberty which, as indicated by the excellent work of Tyrer and Levy,* involving comparative tests with nine different methods, may produce results for the same product showing divergence as great as 6° C., even though the condition of the compound and other details of procedure in the different cases were identical.

The present requirement is also defective in that it permits the operation of varied individual conception as what constitutes the melting-point, thereby conducing to further divergence in results.

And finally it is inconsistent in specifying a melting-range in some cases, while for most compounds it requires literally a melting-point—the latter being impractical, it seems to me, even for the purest compounds obtainable, and, in application to a standard which avowedly permits a certain degree of impurity, it is impossible.

Obviously, if the melting-point is to be of any value whatever as one of the pharmacopœial tests for a standard product, it is essential that all radical causes of divergent results should be eliminated. A perfect melting-point requirement for compounds of pharmacopœial standard is probably not possible at this time, but it seems certain that a very considerable degree of order may be evolved from the present chaos by the next Committee on Revision of the U. S. P. through the adoption of a carefully defined official method, including specific directions covering all details connected with a melting-point determination, and a clear, unmistakable definition of the melting point.

In co-operation with the present committee of Revision the Hygienic Laboratory has recently been conducting an investigation upon pharmacopœial melting-points for the purpose of selecting or devising a method and determining a general procedure which could be recommended for official adoption, and by means of which to standardize the melting-points of pharmacopœial compounds. In approaching this work it was not considered feasible to experimentally test a great variety of methods; nor indeed was such a time-consuming procedure necessary, for the specifications laid before us by the Committee on Revision, calling for the utmost simplicity, availability, and economy consistent with reasonable

* Loc. cit.

efficiency, made possible the elimination by inspection of practically all methods, except one or two which were considered to offer promise.

The method finally adopted consists of one of the capillary-tube variety, more or less modified to meet specific conditions as they developed. It involves the use of a simple round-bottom straight glass tube of about 30 mm. internal diameter and about 100 mm. long, flaring slightly at the top like an ordinary test tube. This tube or container is fitted with a stirring device, which any one can make in a very few minutes from a piece of small-sized, thick-walled capillary glass tubing of such length that a double bend above the top of the container brings the outer end of the stirrer within easy reaching distance of the hand for convenience in manipulation. When in use the container is filled with a suitable bath to a depth which will permit of such an immersion of the bulb of the thermometer that the upper end of the bulb will be 2 to 3 cm. below the surface of the bath and the lower end of the bulb about equally distant from the bottom of the container.

For melting points up to 150°C .—or even to 180°C .—pure concentrated sulphuric acid was considered the most suitable and satisfactory bath. When fresh it can be used at much higher temperature, but then its irritating fumes make it decidedly objectionable. After very considerable experimentation no bath could be found suitable for work at temperatures much above 200°C ., which was not more or less objectionable because of fuming. This difficulty, however, was found to be effectively overcome by a slight modification of the apparatus, which consisted in fitting the container with a cork, perforated for the thermometer and for the stirrer and with two or three small vents at the edge to avoid excessive pressure. With this modification, a very pure grade of cotton-seed oil, freshly distilled paraffin, certain mineral oils, and a few other organic substances could be conveniently used up to 300°C . or over; but they soon become colored and have to be frequently renewed. A bath was finally adopted consisting of a mixture of pure concentrated sulphuric acid and potassium sulphate in definite proportions as recommended by Mulliken.* In my experience this bath, contrary to the claims made for it, fumes at high temperatures almost as badly as the pure sulphuric acid. With the simple cork modification the fumes would char the cork and quickly spoil the bath, but by attaching a disk of thin asbestos to the bottom of the cork and including a glass tube in the perforation for the stirrer, both the fuming and the charring were effectively overcome and the bath could be used as high as 350°C ., or even to 370°C ., with perfect convenience and safety. In all cases where the cork modification was applied the stirrer, in order to avoid inconvenience in attaching the capillary tube to the thermometer, was made in two parts, the first part extending through and

* S. P. Mulliken: "Identification of Pure Organic Compounds," vol. i, p. 219.

about one-half inch above the cork ; the second part being the remainder of the stirrer as first described. The two parts are easily joined, with ample security, by means of a small piece of small bore rubber tubing. The advantage of such an arrangement in connection with the cork hardly needs further discussion.

A list of 37 of the more important pharmacopœial compounds was selected upon which to test the method just outlined and to begin a tentative standardization of their melting points. The compounds selected were at first considered to belong only to that class whose melting-point determination by a capillary-tube method offers no complication. I believe, however, that the application of this method to all other classes (such as fats, waxes, etc.) involves only modification in details and procedure and not any material change of apparatus. Furthermore, I can see no objection to applying it as a modification of Landolt's method in those cases where it would seem feasible and desirable to determine the melting-point or freezing-point of a compound by using a comparatively large amount, with the thermometer dipping directly into the substance. These points remain to be determined by further experimentation.

In the course of the work the value and utility of the melting-point when accompanied by decomposition became seriously questioned and compounds of this type were placed in a separate group for subsequent special investigation, thereby reducing the list for immediate investigation to 23 compounds.

The purpose of the work made it extremely desirable that a market sample from every manufacturer of each product should be obtained. To that end we entered into correspondence with several manufacturing firms but their extreme conservatism in giving information on this point soon disclosed the impracticability of the plan and we were forced to adopt the unsatisfactory alternative of considering that every sample in the market bears the label of the firm that makes it. Acting upon this alternative we were able to obtain, in most cases, 5 to 8 different samples of each compound. From 4 to 8 or more determinations of the melting-point were made on each of these samples according to the following procedure :

A small portion of the compound was ground in a mortar to a fine powder and dried in an ordinary desiccator over sulphuric acid for at least 24 hours. It was then introduced into a thin-walled capillary tube, of not less than one mm. nor more than two mm. diameter, until the material in the bottom of the tube formed a column two or three mm. high. The tube was then attached to a standardized thermometer, in such a manner that the sample was centrally located along the side of the mercury bulb, and lowered to position in the bath. The container was then heated by direct application of a small Bunsen flame, the temperature being raised at a rate merely consistent with reasonable caution (about 20° to 30° C. per minute) until within 20° to 25° C. of the melting-point. It was then

definitely regulated so as to maintain as nearly as possible a uniform rise of 3° C. per minute until the compound showed definite signs of melting when the rate was changed to 0.5° C. per minute. Constant stirring was applied throughout the experiment. The temperature range over which the substance was definitely observed to be melting was recorded as the melting-point. In this connection it was found that the point of initial melting might be variously determined by different individuals, or even by the same individual under different conditions, and it was therefore necessary to fix upon some characteristic behavior which would insure reasonable uniformity in this particular. After much experimentation, following the procedure outlined above, it was considered that the behavior could be defined, within reasonably narrow limits, as that temperature at which any point in the column of material was observed to collapse against the side of the tube.

Correction for the emergent stem of the thermometer was applied in all cases. To experimentally determine this for each experiment was obviously impracticable. A series of corrections for each of the two standard thermometers used were made independently at different times by two individuals. The average results obtained were plotted in a curve on co-ordinate paper and from this curve the emergent stem correction at any temperature could be determined by inspection. The error thus introduced in the final results, because of possible subsequent variation in room-temperature, is insignificantly slight and in most cases is doubtless less than the error that may result from slightly varied manipulation in different measurements of the correction. In fact the latter may be considerable and for this reason it would seem very desirable, if feasible, that official thermometers be prescribed as a part of the official method. Official corrections could then be determined and published in a table or curve thus eliminating another drawback to real standardization of U. S. P. melting-points.

The melting-points of the 23 compounds referred to having been determined, all samples were then subjected to the more important and specific of the other Pharmacopœial tests to determine their standard.

In the following tabulation each value given in the column under Hygienic Laboratory represents the average of all determinations on all corresponding samples of standard grade. When two or more values are found in this column under the same compound it indicates that different samples of standard grade showed consistent differences in melting-point and were therefore averaged separately. Such a condition is significant and suggests either that the same percentage of different kinds of impurity has a markedly different effect on the melting-point or, that the melting-point determination is a more effective method for detecting slight variations than other Pharmacopœial tests. In any case the fact constitutes a complication in melting-point standardization which remains to be overcome.

It is also true that in connection with a few compounds minor details of the work remain to be completed and the values here given may therefore be slightly affected.

In general, however, I believe these results are as exact and reliable as could reasonably be required, but it is certainly desirable that the results obtained by any method should be duplicated by several operators, applying exactly the same procedure, before being adopted as the U. S. P. official requirement.

The official melting-point requirements of six different pharmacopœias for the same compounds and the values given in the common and more important sources of the chemical and pharmaceutical literature are added in the table for the purpose of comparison. A study of the comparative data in several instances will serve to further emphasize the need of investigation and standardization of melting points. At the same time, it should be recognized that the compounds here included represent the simplest to which the melting-point test can be applied, and also that the remarkable concordance sometimes found in the various official requirements does not necessarily indicate experimental duplication of the determinations.

TABLE SHOWING COMPARATIVE VALUES FOR MELTING-POINTS OF SOME PHARMACOPŒIAL COMPOUNDS AS OBTAINED FROM DIFFERENT SOURCES.

Compound	Hygienic Laboratory Method.	Official Requirements of Different Pharmacopœias.							Literature.	
		U. S.	German.	French.	Brit. P. C.	Austrian.	Swiss.	Richter.	Beilstein.	Schmidt.
Acetanilidum	112°-113.7° 113.3°-114.2°	113°	113°	113°	113.5°	113°-114°	113°-114°	115°-116°	112°	113°-114°
Acetphenetidinum (Phenacetin)	133.6°-134.4° 134.2°-134.8°	134°-135°	134°-135°	135°	135°	135°	134°-135°	135°	.....	134°-135°
Acidum Benzoicum	121.3°-122.3°* 121.3°-122.3°*	120°-122°	.....	121°	121.4°	.....	.....	121.4°	121.4°	.....
Acidum Camphoricum ..	186.8°-188.1°* 184.1°-186.7°	187°	186°	.....	186°-187°	.....	186.5°	187°	187°	188°
Acidum Salicylicum	158.1°-159.0°* 150.2°-110.8°*	156°-157°	157°	157°	156°-157°	157°	156°-157°	155°-156°	155°-156°	.....
Antipyrina	110.6°-111.2° 115.1°-116°	113°	113°	114°	113°	110°	111°-113°	113°	113°	113°
Atropina	114.1°-115.1° 121.2°-121.7°	113.8°	Not official 115.5°	115.5°	115.5°	Not official 115.6°	Not official	115°-115.5°	.....	115°-115.5°
Betanaphthol	121.2°-121.7° 121.5°-122.2°	122°	122°	123°	122°	122°	122°	122°	122°	123°
Camphora Monobromata. (Chloralformamidum (Chloralamid)	74.8°-75.6° 75.5°-76.2°	76°	Not official	76°	76°	Not official	76°	76°	76°	76°
Cocaina	116.4°-117.2°† 96.2°-96.9° 97°-97.7° 97.5°-100.†	114°-115° 98°	114°-115° Not official	Not official 98°	Not official 98°	Not official 98°	Not official 98°	115°-116° 98°	..... 98°	115° 98°
Naphthalenum	79.8°-80.5° 80.1°-80.6°	80°	80°	Not official	80°	80°	79°-80°	80°	80.06°	79.2°

* May be slightly affected by minor details of manipulation formulated after these values were determined.

† Only one product obtainable.

* Only one sample of this compound showed such wide melting range. The other pharmacopœial tests (which at least in the case of cocaine are very unsatisfactory) disclosed no difference in the samples.

TABLE SHOWING COMPARATIVE VALUES FOR MELTING-POINTS OF SOME PHARMACEUTICAL COMPOUNDS AS OBTAINED FROM DIFFERENT SOURCES.—*Concluded.*

Compound	Hygienic Laboratory Method.	Official Requirements of Different Pharmacopœias.							Literature.	
		U. S.	German.	French.	Brit. P. C.	Austrian.	Swiss.	Richter.	Beilstein.	Schmidt.
Homatropinæ Hydrobromidum Phenylis Salicylas Piperine	{ 209.6°-215.1°* 211.0°-214.2° 42.1°-42.7° 130.3°-131° }	213.8°	No m. p. given	Not official	210°-212°	Not official	209°-212°	.....	.....	.....
		42°	42°	42.5°	42°	42°-43°	42°-43°	42°-42.5°	42°-42.5°	42.5°
		130°	Not official	Not official	130°	Not official	Not official	.....	.....	128°-129°
		127.4°-129.5°†								
Pyrogallol Resorcinol Salicinum	{ 131.5°-132.6°* 130.5°-131.5°* 132.5°-133.1°* }	132°	131°-132°	133°	131°	130°	131°-133°	132.5°-133.5°	132.5°-133.5°	131°-132°
		109°-111°	110°-111°	110°	119°	110°-111°	110°-111°	110° (119°)	110° (119°)	111°-112°
		201.4°	Not official	Not official	201°	Not official	Not official	201°	198° (201°)	(118°) 201°
		170.3°	170°	170°	170°	170°	170°-174°	169°-170°	169°-170°	170°
Santoninum Sulphonethylmethanum Sulphonmethanum Thymol Vanillinum	{ 171°-172°* 171.4°-172.2°* 76.5°-77.3° 76.0°-76.7° }	76°	76°	76°	76°	76°	76°-78°	76°	76°	76°
		125.5°	125°-126°	125.5°	125°-126°	125°-126°	125°-126°	125°-126°	125°-126°	125.5°
		50°-51°	50°-51°	51.5°	44°-51°	50°-51°	50°-51°	51.5° (50°)	50° (51.5°)	50°-51°
		80°-81°	Not official	80°-81°	80°-81°	Not official	Not official	80-81°	80°-81°	80°-81°

* May be slightly affected by minor details of manipulation formulated after these values were determined.

† The behavior on melting, although quite uniform, of five different samples of this compound was very unsatisfactory. Re-melting indicates that the first melting is accompanied by slight decomposition, which does not become vigorous, however, until above 250°. It should therefore be further investigated with compounds which decompose on melting, but many careful determinations on different samples furnish uniform results which are included in this table for the striking commentary they suggest on the present U. S. P. requirement.

THE STANDARDIZATION OF STROPHANTHUS.

BY H. ENGELHARDT & H. W. JONES.

At the present time three species of strophanthus are used, viz. : strophanthus Kombé, strophanthus hispidus, and strophanthus gratus. While the glucoside obtained from the first two varieties occurs as a more or less colored varnish, the glucoside obtained from strophanthus gratus is crystalline. Inasmuch, however, as the last mentioned variety is on the market to a small extent only, the other two are used exclusively. In the pharmacopœias at our disposal we find that strophanthus Kombé is official in the U. S., German, Hungarian, British, Swiss, Austrian and Danish pharmacopœias. The Dutch and Swedish do not specify Kombé, but from the text it can be understood that strophanthus Kombé is recognized. The Spanish allows both Kombé and hispidus, while in the French Codex and the Italian and Belgian pharmacopœias, the hispidus variety is official. No species is mentioned in the Pharm. Japon.

To differentiate the two varieties, Kombé and hispidus, the sulphuric acid test is prescribed, which is best carried out by either soaking the seeds in water, removing the seed-coat and treating the endosperm with concentrated sulphuric acid, or by making a cross-section of the seed and treating this in the same way, a more or less pronounced green color will be produced in case of Kombé seeds varying in intensity with the amount of strophanthin present in the seeds, while hispidus and gratus seeds do not produce this color.

Schaub (Apoth. Ztg., 1908, p. 920), recommended that the concentrated sulphuric acid be replaced by a weaker acid, *i. e.*, an 80 per cent. acid, to avoid any charring which might be produced by the use of concentrated acid. This latter method is adopted by the Hungarian and Danish pharmacopœias; according to various authors, however, concentrated sulphuric acid does not cause a charring.

The sulphuric acid method was further modified by G. Sharp (Pharm. Journ., 1906, 11, 258), who proceeds, as follows: Cut the seed in four parts, moisten these with sulphuric acid, sp. gr. 1.094, and heat for one minute, when a green color will be produced. This method, however, has no advantage over that with concentrated sulphuric acid, which as may be mentioned here is adopted by most of the new pharmacopœias: only the Italian and Belgian pharmacopœias giving no directions for the color test.

Various methods for the determination of strophanthin in strophanthus have been devised. Of the older ones, those of Fraser, Elborne, and Barclay may be mentioned. About ten years ago (Drugg. Circ., 1900), these methods were tried in this laboratory, and it was found that the last mentioned method gives the best and most concordant results. This method was later modified by Fromme, and described in the *Geschaefts-*

bericht von Caesar & Loretz, 1906; Fromme also found that the factor given by Barclay for the ratio of strophanthin to strophanthidin is not 2.74 but 2.187, thus reducing the amount of strophanthin obtained by Barclay's method considerably.

Another assay method was recommended in the *Jahresbericht der Pharmacie*, 1905, p. 28, and is carried out as follows: After removing the fat from the crushed seeds with petroleum ether, the seeds are dried again and extracted for three hours with 90 per cent. alcohol. The alcoholic solution is then filtered, the alcohol evaporated and the residue extracted with water. To the aqueous solution a few drops of lead subacetate solution are added and after shaking well the mixture is filtered. From the filtrate the glucoside may be isolated (1) by precipitating with tannic acid, decomposing the tannate by heating with lead oxide, extracting the dry lead oxide mixture repeatedly with alcohol and precipitating the strophanthin from the alcoholic solution by ether, or (2) by removing the excess of lead in the filtrate by gradually adding ammonium sulphate, filtering and salting out the strophanthin with a large excess of ammonium sulphate. The precipitate thus formed is treated with alcohol and the glucoside precipitated from the alcoholic solution with ether. The process of recovering the strophanthin by these two methods gives low results, due to an unavoidable loss of the glucoside.

Another method was recommended some years ago by E. W. Mann (*Pharm. Journ.*, 1906, 2, 93), who proceeds as follows: 100 Gm. of powdered seeds are deprived of fat by extracting with petroleum ether and the resulting powder, free from fat, is extracted with hot alcohol. The alcoholic solution is evaporated, the residue taken up with water and the solution saturated with subacetate of lead. The excess of lead is removed from the filtrate with sodium sulphate and the filtered solution evaporated with 10 Gm. of fine sand. The mixture, after perfect drying, is extracted with boiling amyl alcohol. The amyl-alcohol solutions are then evaporated at a temperature not exceeding 60° C. and the residue weighed. This method, besides being very circumstantial, and requiring a large amount of material, does not give accurate results.

In the following investigation we, therefore, applied Barclay's method with Fromme's modification. This method is carried out as follows: 7 Gm. of finely crushed seeds are heated in an Erlenmeyer flask of 200 Cc. contents with 70 Gm. of absolute alcohol for one hour, and after cooling, any alcohol lost by evaporation is replaced. After thorough mixing, 50.5 Gm. of the alcoholic liquid, equal to 5 Gm. of the seed, are filtered into a porcelain dish of 9 to 10 Cm. diameter, the alcohol evaporated on a water-bath, and the residue extracted with petroleum ether. The petroleum ether is filtered through a plain filter of 5 Cm. diameter and dish and filter washed with petroleum ether. The insoluble residue on the filter is then rinsed with 5 to 8 Gm. of boiling water into a porcelain dish, the contents

of the latter heated to boiling, mixed well with 5 drops of solution of sub-acetate of lead and about 0.2 Gm. of infusorial earth. The liquid is then filtered into an Erlenmeyer flask of 100 Cc. contents and the dish and filter washed with boiling water until the filtrate no longer tastes bitter. To the filtrate five drops of hydrochloric acid are added and the mixture heated to boiling on an asbestos plate over a small flame for two hours. Any water lost by evaporation is replaced by adding distilled water, until the contents of the flask weigh 20 Gm. After cooling, the liquid is shaken with 10 and 10 Cc. of chloroform, which is filtered into a tared Erlenmeyer flask of 100 Cc. capacity. The aqueous liquid is again heated for one-half hour and, after cooling, again shaken out with 10-10-10 Cc. of chloroform. The combined chloroformic filtrates are then distilled and the residue dried in a desiccator to constant weight. The weight obtained multiplied by 2.187 gives the amount of strophanthin in 5 Gm. of the seeds. For the sulphuric acid reaction we adopted the following method, also originated by Fromme: 20 seeds are softened for one-fourth hour in cold water and, after removing the hulls, are put upon a porcelain or glass plate and treated with one drop of concentrated sulphuric acid; a green color of the endosperm should be produced in all the seeds.

In addition to this test we also applied the method of treating the seeds with an 80 per cent. sulphuric acid.

We have examined seven samples of strophanthus seed, of which two were marked "hispidus" and one was unmarked, and have obtained the following results:

	Concentrated H_2SO_4 .	80 Per Cent. H_2SO_4 .
1. Kombé.	About 70 per cent. show a green color.	Same.
2. Kombé.	About 90 per cent. show a green color.	Same.
3. Kombé.	All show a green color.	Same.
4. Kombé.	All show a green color.	Same.
5. Hispidus.	All show a green color.	Same.
6. Hispidus.	About 10 per cent. show a green color.	None show a green color.
7. Not marked.	About 16 per cent. show a green color.	About 16 per cent. show a green color.

Percentage of Strophanthin.	
1. 4.54	5. 6.43
4.68	6.25
2. 6.12	6. 5.16
6.19	5.03
3. 5.67	7. 2.71
5.67	2.66
4. 5.68	
5.77	

As will be seen from the above results, only three samples consist entirely of Kombé seed, among these the one which was marked "Hispidus." Two of the samples contained Kombé seed to a large extent, while

one of them marked *Hispidus* and the other not specified are apparently *Hispidus* seeds mixed with a small percentage of *Kombé* seed.

As regards the percentage of strophanthin in the samples, all of them must be considered as fair commercial samples. A good *Kombé* seed, however, should contain at least 7 to 8 per cent. of strophanthin. As none of the samples comes up to this standard, and as inferior products are liable to be found on the market, standardization of *strophanthus* seed seems to be justified.

The foregoing claim, that seeds with at least 7 per cent. of strophanthin should be used, is made by Reyden also (*Farmaceutisk Tidskrift*, 1910, Nos. 4 and 5). This author found that the best results in identifying the seeds are obtained by Schaub's method and that Fromme's method for the estimation of strophanthin gives very concordant results.

Very interesting experiments were made by Hefter, (*Ther. Monatshefte* 1909, page 45) more or less confirming the above statements, for the details of which the original article should be consulted.

By numerous experiments on frogs it was found by Focke that the amount of strophanthin found by Fromme's assay method is proportional to the physiological activity, a statement which was later verified by other investigators.

We, therefore, come to the conclusion that the new *Pharmacopœia* should adopt a standard and an assay method for *strophanthus* seed.

We desired to make comparative tests with *Strophanthus gratus*, but unfortunately we have not been able to procure samples of this variety.

THE RESULTS OF A FEW CRUDE DRUG ASSAYS.

BY HENRY J. GOECKEL.

The assays reported here were made since 1906 or since the Eighth Revision of the *Pharmacopœia* was published and will therefore aid in giving an idea of the quality of the crude drugs offered within the period since then.

In assaying drugs the writer has from time to time noticed a factor to which little attention appears to be given by many assayers. This is the difference in the amount of moisture contained in various lots of drugs. Though the U. S. P. does not place any stress upon this, it ought to be noted.

The divergent results obtained by different assayers and by pharmacists who take the trouble to assay their supplies can in the writer's opinion be at times accounted for by the fact that through changed conditions in transit or in storage the moisture content of the drugs varies. This can readily occur without the sample showing any outward difference. In the instance of drugs of low alkaloidal contents this will be most noticeable.

For the most part goods are not packed in moisture-proof containers

and freight handlers are not particular or interested enough to see that the freight is well protected during rainy weather. Likewise the writer has often noted some of the most reliable supply houses have packed drugs in paper containers and then used not only moist but actually wet excelsior to fill the cases in which the goods were shipped.

In my experience the effect which the moisture contents may have on the results of assays was well shown by a lot of belladonna root. This when received gave 0.493 per cent. of mydriatic alkaloids by the U. S. P. process. This was the result of a duplicate assay as are all the results here given. The same sample from which the assay was made was dried for a few days and was then found to yield 0.534 per cent. of alkaloids, more than sufficient to pass it.

Acacia.

Of four lots of acacia in powder examined the ash yield was for No. 1 quality, 3.05 per cent., and 3.09 per cent., for No. 2, 2.8 per cent. and for No. 3 quality it was 3.17 per cent.

Belladonna Leaves.

Of six lots of belladonna leaves examined, two were above the requirements of 0.35 per cent. of mydriatic alkaloids and four were below.

1....0.532 per cent. of alkaloids.	3....0.283 per cent.	5....0.247 per cent.
2....0.391 " " "	4....0.254 " "	6....0.2416 " "

Belladonna Root.

One lot examined before drying0.493 per cent. of alkaloids.

After "0.534 " " "

Codeine Phosphate.

Four samples of codeine phosphate examined gave respectively 70.399 per cent., 72.43 per cent., 75.41 per cent. and 89.04 per cent. of alkaloid base.

Ipecacuanha.

Of eight lots of ipacac root examined, only one came up to the requirement of 2 per cent. of alkaloids, four were above the 1.75 per cent. standard, and three were below this. The samples were of the entire root as directed by the U. S. P.

1....before powdering 2.1 per cent. of alkaloid.			
after " 2.048 " "	5....1.783 " "		
2.... " " 1.955 " "	6....1.721 " "		
3.... " " 1.917 " "	7....1.416 " "		
4....1.836 per cent. of alkaloids.	8....1.266 " "		

Jalapa.

Four lots of jalap examined all came up to the U. S. P. requirements.

	Ether Sol.	Alcohol Sol.	Total Resin.
1.....	1.231 per cent.	10.980 per cent.	12.211 per cent.
2.....	1.487 "	7.487 "	9.3495 "
3.....	1.401 "	7.02 "	8.421 "
4.....	1.366 "	8.159 "	9.5257 "

Malt Extract.

One lot of malt extract examined gave

Alcohol (absolute).....4 per cent. Diastasic strength.....6.751 per cent.

Magnesium Carbonate.

One lot of magnesium carbonate examined was not clearly soluble in acetic acid, gave a slight flocculent precipitate, and showed considerable calcium and iron.

Pancreatin.—Eleven lots of pancreatin from original containers gave results as follows:

	Proteolytic Test.	Amylolytic Test.	Strength.
1.....	Passed	Low	
2.....	Low	Low	
3.....	Passed	Passed	U. S. P.
4.....	Passed	Passed	U. S. P.
5.....	Low	Low	
6.....	Low	Passed	
7.....	Passed	Passed	U. S. P.
8.....	Low	Low	
9.....	Passed	Passed	U. S. P.
10.....	Passed	Passed	U. S. P.
11.....	Low	Low	

Five lots out of the eleven passed both requirements, two passed one requirement and four did not conform in either one.

Pepsin.—Eleven lots of pepsin from original containers gave results as follows:

	Kind.	Strength.	Moisture.	Standard.
1.....	Scale	Low		
2.....	Powdered	Low		
3.....	Scale	Passed		U. S. P.
4.....	Powder	Low	5.84 per cent.	
5.....	Scale	Passed	6.47 per cent.	U. S. P.
6.....	Powder Aseptic	Passed	6.74 per cent.	U. S. P.
7.....	Powder	Passed		U. S. P.
8.....	Powder	Passed		U. S. P.
9.....	Granular	Passed		U. S. P.
10.....	Powder	Passed		U. S. P.
11.....	Powder	Low		

Seven passed the U. S. P. requirements and four did not.

THE RESULTS OF EIGHTY-SEVEN OPIUM ASSAYS.

BY HENRY J. GOECKEL.

The following reported assays were made since 1906 on eighty-seven lots of opium as submitted in New York.

The process of assay was that of the U. S. P. with the exception that twenty cubic centimeters of lime water more than directed by the Pharmacopœia was used.

Of the forty-two lots of dried gum assayed, one yielded less than 11.4 per cent., namely 10.08 per cent. of crystallizable morphine. Of the forty-five lots of moist gum three were below 10 per cent. and one of these below 9 per cent.

The dried gum yielded as follows :

1....14.585 % cryst. morph.	15....14.028 % cryst. morph.	29....13.107 % cryst. m.
2....14.558 "	16....13.865 "	30....13.077 "
3....14.500 "	17....13.857 "	31....13.010 "
4....14.475 "	18....13.857 "	32....12.937 "
5....14.460 "	19....13.850 "	33....12.919 "
6....14.378 "	20....13.695 "	34....12.860 "
7....14.363 "	21....13.685 "	35....12.625 "
8....14.295 "	22....13.626 "	36....12.606 "
9....14.185 "	23....13.613 "	37....12.568 "
10....14.167 "	24....13.498 "	38....12.278 "
11....14.134 "	25....13.447 "	39....11.810 "
12....14.123 "	26....13.371 "	40....11.526 "
13....14.080 "	27....13.330 "	41....11.445 "
14....14.057 "	28....13.206 "	42....10.080 "

The moist gum yielded as follows :

43....13.657 % Morph.	58....11.790 % Morph.	73....11.075 % Morph.
44....13.191 "	59....11.770 "	74....10.921 "
45....13.123 "	60....11.750 "	75....10.835 "
46....13.082 "	61....11.688 "	76....10.727 "
47....12.810 "	62....11.673 "	77....10.712 "
48....12.678 "	63....11.608 "	78....10.515 "
49....12.460 "	64....11.346 "	79....10.484 "
50....12.468 "	65....11.312 "	80....10.414 "
51....12.307 "	66....11.311 "	81....10.370 "
52....11.928 "	67....11.300 "	82....10.283 "
53....11.915 "	68....11.220 "	83....10.206 "
54....11.908 "	69....11.207 "	84....10.062 "
55....11.864 "	70....11.114 "	85....9.995 "
56....11.833 "	71....11.113 "	86....9.644 "
57....11.800 "	72....11.080 "	87....8.898 "

A resume of the results on the dried gum shows :

15....35.7 per cent. yielded.	....14 to 15 per cent. of crystallizable morphine.
16....38.1 "	....13 to 14 "
7....16.6 "	....12 to 13 "
3....7.1 "	....11 to 12 "
1....2.38 "	....10.080 "

The maximum was 14.585 per cent., the minimum, 10.080 per cent. and the average was 13.427 per cent. of morphine.

A resume of the lots of moist gum shows :

4.....	8.88	per cent.	yielded.....	13 to 14	per cent.	morphine.
5.....	11.11	"	"	.... 12 to 13	"	"
22.....	48.88	"	"	.... 11 to 12	"	"
11.....	24.44	"	"	.... 10 to 11	"	"
2.....	4.44	"	"	.... 9 to 10	"	"
1.....	2.22	"	"	.... 8.898	"	"

The maximum was 13.657 per cent., the minimum 8.898 and the average was 12.385 per cent. of morphine.

THE RESULTS OF SIXTY COCA ASSAYS.

BY HENRY J. GOECKEL.

In view of the fact that this meeting of the American Pharmaceutical Association is a pre-revision of the United States Pharmacopœia gathering, and as the standard of ether-soluble alkaloid requirement in coca by the present revision of the U. S. P. (8th) is considered too low by some of the members of this Association, the results of sixty assays of lots of coca leaves examined since 1905 for Schieffelin & Co. by the writer will perhaps be of interest.

The results tend to confirm the claim that the present requirements are too low.

Of all the assays only two (2) were below 0.612 per cent. of ether-soluble alkaloids; one, an Erythroxyton Coca, yielded 0.558 per cent., and the other, an Erythroxyton truxillense, yielded 0.582 per cent. of alkaloids.

Thirty of the assays were on lots of Erythroxyton Coca, of which I have not the commercial name. They were probably Huanuco leaves and represent more than 1500 bales of leaves.

In each instance where the number of bales is known to the writer the fact is stated.

1....	95 bales.	0.852 % eth. sol. alk.	16....	41 bales.	0.744 % eth. sol. alk.
2....	46 "	0.852 " "	17....	15 "	0.7404 " "
3....	63 "	0.846 " "	18....	15 "	0.738 " "
4....	115 "	0.826 " "	19....	82 "	0.738 " "
5....	74 "	0.816 " "	20....	43 "	0.720 " "
6....	4 "	0.804 " "	21....	105 "	0.696 " "
7....	119 "	0.792 " "	22....	105 "	0.684 " "
8....	86 "	0.792 " "	23....	26 "	0.666 " "
9....	87 "	0.792 " "	24....	? "	0.660 " "
10....	? "	0.7866 " "	25....	31 "	0.654 " "
11....	39 "	0.780 " "	26....	? "	0.648 " "
12....	87 "	0.768 " "	27....	? "	0.642 " "
13....	? "	0.765 " "	28....	? "	0.637 " "
14....	87 "	0.762 " "	29....	72 "	0.624 " "
15....	75 "	0.756 " "	30....	? "	0.558 " "

Five lots were of *Erythroxylon Coca* designated as Huanuco leaves and represent lots totaling 216 bales of leaves :

1..42 bales 0.942 per cent. eth. sol. alk.	4..40 bales 0.855 per cent. eth. sol. alk.
2..40 " 0.888 " " " "	5..47 " 0.816 " " " "
3..47 " 0.888 " " " "	

Five assays were on Cuzco leaves, totaling 348 bales and gave the result as follows :

1..46 bales 0.894 per cent. eth. sol. alk.	4..46 bales 0.762 per cent. eth. sol. alk.
2..75 " 0.810 " " " "	5..86 " 0.714 " " " "
3..95 " 0.780 " " " "	

One lot of Maxillo leaves, 87 bales assayed.....0.810 per cent. eth. sol. alk.

One lot of Amazon leaves, 42 bales assayed.....0.750 per cent. eth. sol. alk.

Of Truxillo leaves—*Erythroxylon truxillense* (Rusby) of the Pharmacopœia—eighteen lots totaling over 800 bales of leaves gave results as follows :

1.. ? bales 1.11 per cent. eth. sol. alk.	10..242 bales 0.780 per cent. eth. sol. alk.
2.. ? " 0.982 " " " "	11.. 29 " 0.726 " " " "
3.. ? " 0.9060 " " " "	12..242 " 0.726 " " " "
4..30 " 0.864 " " " "	13.. ? " 0.7236 " " " "
5.. ? " 0.834 " " " "	14.. 75 " 0.666 " " " "
6..75 " 0.816 " " " "	15.. 76 " 0.654 " " " "
7..73 " 0.816 " " " "	16.. 92 " 0.648 " " " "
8.. ? " 0.804 " " " "	17.. 30 " 0.612 " " " "
9..11 " 0.792 " " " "	18.. 72 " 0.582 " " " "

A resume of the results of the forty-two (42) *Erythroxylon Coca* assays shows :

1 lot..... 42 bales.....assayed.....	0.942 per cent. alk.
6 lot.....314 "	" between..0.852 " 0.888 "
7 lot.....465 "	" " ..0.804 " 0.846 "
12 lot.....763 " plus	" " ..0.750 " 0.792 "
6 lot.....282 "	" " ..0.714 " 0.744 "
5 lot.....267 "	" " ..0.654 " 0.696 "
4 lot..... 72 "	" " ..0.624 " 0.648 "
1 lot..... ? "	" " ..0.558 "

The maximum was 0.942 per cent., minimum 0.558 per cent., average 0.687 per cent. of alkaloids.

A resume of the results on Truxillo leaves shows :

1 lot..... ? bales.....assayed.....	1.11 per cent. alkaloïds.
1 lot..... ? "	" ..0.982 "
1 lot..... ? "	" ..0.9060 "
1 lot..... 30 "	" ..0.864 "
4 lot.....148 " plus	" between ..0.804 to 0.834 "
2 lot.....253 "	" " ..0.780 " 0.792 "
3 lot.....271 "	" " ..0.7236 " 0.726 "
2 lot.....151 "	" " ..0.654 " 0.666 "
2 lot.....122 "	" " ..0.612 " 0.648 "
1 lot..... 72 "	" " . 0.582 "

The maximum was 1.11 per cent., minimum 0.582 per cent., average 0.780 per cent. alkaloids.

The preceding assays were made according to the following method :

Twenty (20) grams of well-ground coca leaves are agitated for one (1) hour in a mechanical shaker with kerosene 200 Cc. and a few Cc. of dilute ammonia. Then extract in percolator to 500 Cc. with kerosene. Percolate is then extracted with four portions of HCl (15 pts. to 200 pts. H₂O). The acid liquor is washed with three portions of ether, then made alkaline with a slight excess of ammonia, extract with ether 20 Cc., 15 Cc., and 15 Cc., evaporate at 65 to 70 degrees Centigrade in a tared beaker. The amount of $\frac{N}{10}$ H₂SO₄ required is estimated by dividing the weight by 0.03. Dissolve the alkaloids in ether, add a slight excess of $\frac{N}{10}$ H₂SO₄, evaporate off the ether, add 3 drops of cochineal indicator, titrate excess of $\frac{N}{10}$ H₂SO₄ with $\frac{N}{10}$ NaOH, multiply the difference between the acid and the alkali by 0.03 to get the weight of the alkaloid calculated as cocaine.

IDENTIFICATION OF METHYL ALCOHOL IN ETHYL ALCOHOL.

BY H. ENGELHARDT AND H. W. JONES.

The numerous methods which have been devised for the identification of methyl alcohol in ethyl alcohol may be grouped as follows :

1. Those methods in which the identification is made by certain reactions given by those substances which usually accompany methyl alcohol, *i. e.*, acetone, etc.
2. Those methods in which the alcohol is subjected to a complete oxidation by chromic acid or other oxidizing agents.
3. Those methods in which the methyl alcohol is oxidized to formaldehyde by applying red-hot copper or platinum spirals.
4. Those methods in which only a partial oxidation of the mixed alcohols is carried out by the action of oxidizing agents such as chromic acid or potassium permanganate.

The methods of the first group must be considered as entirely unreliable, inasmuch as comparatively pure methyl alcohol (Colonial spirit), free from acetone or other products derived from the destructive distillation of wood, can easily be obtained.

A few methods of this group may be mentioned here. That originated by Reynolds (Pharm. Journ. 1864, 5, 272 ; 1865, 6, 292), and later on modified by Tuck (Pharm. Journ., 1865, 6, 215, *et seq.*), depends on the property of acetone to prevent the precipitation of mercury salts by caustic potash. The one by Guyard (Bull. Soc. Chim., 1879, 297), is based on the fact that wood alcohol forms iodoform in the cold with alkaline potassium-iodide iodine solution.

Watanabe's (Journ. Pharm. Society Japan, 1909. May) method depends

on the formation of a flocculent precipitate which is produced by the addition of Nessler's reagent to grain alcohol containing methyl alcohol.

Carette's (Journ. Pharm. et Chim., 1909, 481) method is carried out as follows: The liquid under examination is distilled, and to 5 Cc. of the first distillate 5 Cc. of water and 3 Cc. of ammonia water are added, and then 1 Cc. of tincture of iodine (French codex), when by the acetone present in the methyl alcohol iodoform will be formed after allowing the liquid to stand, with occasional shaking, in diffused light.

Habermann and Esterreicher (Zeitsch. Analyt. Chem., 1901, No. 11), found that methyl alcohol decolorizes potassium permanganate much more easily than ethyl alcohol, which statement, however, was contradicted by Schoorl (Zeitsch. Anal. Chem., 1902, 426), who found that the permanganate is more difficultly decolorized by pure methyl alcohol than by pure ethyl alcohol.

To the second group belongs the method of Dupré (Analyst. 1876, 1), who oxidizes the mixture of methyl alcohol and ethyl alcohol, with chromic acid; while under certain conditions the methyl alcohol is oxidized to carbonic acid and water, ethyl alcohol is oxidized to acetic acid. The mixture is distilled and the distillate is titrated with caustic potash, and from the amount of caustic potash used the percentage of ethyl alcohol is calculated. The difference between the amount of the mixture taken and the alcohol calculated from the acetic acid is considered as methyl alcohol.

Thorpe & Holmes (Proc. Chem. Soc. [Lond.] 1903, 285), distill the mixture of ethyl alcohol and methyl alcohol with potassium chromate and sulphuric acid. They found that when the process is properly conducted, the methyl alcohol is oxidized to carbonic acid and water while the ethyl alcohol is oxidized to acetic acid. The carbon dioxide is absorbed in a bulb filled with soda lime, and from the increase in weight the wood alcohol can easily be estimated.

The method of oxidizing the mixture of methyl and ethyl alcohol by treating it, in proper dilution with water, with a red-hot copper spiral, was first applied by Mulliken and Scudder (Am. Chem. J. XXI, 266; *ibid.*, XXIV, 444), and later on modified by Prescott (Pharm. Arch. 4, 86). The method, which is also official in the U. S. P., depends upon the fact that methyl alcohol is oxidized to formaldehyde, while ethyl alcohol is oxidized to acetaldehyde. The latter, by boiling, can easily be removed, and with the resulting solution of formaldehyde or its polymers various reactions for the detection of formaldehyde with various reagents can be made. While Prescott in his original method proposed to treat the formaldehyde solution with phloroglucine solution and caustic potash, by which a red color is produced when all the acetaldehyde has been properly eliminated, Haigh (Pharm. Rev. 1903, No. 10) uses a diluted phenylhydrazinehydrochloride solution, sodium nitroprussiate solution and strong caustic potash,

by which a blue to green color is developed. The U. S. P. uses, as is well known, the resorcinol solution. Kahn (D. A. Apoth. Ztg. through Pharm. Ztg. 1905, 651) mixes the formaldehyde solution, obtained by the oxidation of the methyl alcohol with copper, with milk containing a trace of ferric chloride, and underlays the mixture with concentrated sulphuric acid. In the presence of formaldehyde a purple color will be produced at the zone of contact. Other workers have used morphine-sulphuric acid as reagent, which without doubt is a very delicate reaction for this aldehyde. Phloroglucine, according to various investigators, is almost as sensitive towards formaldehyde as the morphine-sulphuric acid, but the color produced by the former is not as distinct as that produced by the latter. According to Fendler & Mannich (Arb. pharm. Inst. Univ. Berlin, 1906, 249), $\frac{1}{1000}$ Mg. of formaldehyde can be identified in a dilution of 1 to 100000 by applying a solution of morphine in concentrated sulphuric acid, and it is not necessary to remove the acetaldehyde entirely, as this gives only a yellow coloration with the reagent.

The process for oxidizing the mixtures of methyl alcohol and ethyl alcohol by a red-hot copper spiral has, according to several investigators, a number of disadvantages, one being that a part of the ethyl alcohol is also reduced to formaldehyde, another one that by eliminating the acetaldehyde by prolonged boiling a part of the formaldehyde is lost, and further, that by this method only 2 to 5 per cent. of methyl alcohol can be estimated in the grain alcohol.

However, when the oxidation is carried out carefully, only an infinitesimal amount of formaldehyde is formed from the ethyl alcohol. When, further, morphine-sulphuric acid or phloroglucine are used as reagents the presence of 1 per cent. of methyl alcohol can be shown with the former and of 0.5 per cent. with the latter.

It is necessary, however, to make a blank test with pure ethyl alcohol when phloroglucin is used, for better comparison of the color. By boiling the mixture rather permanent and distinct colorations can be obtained.

By the resorcinol test the color obtained with alcoholic liquids containing less than 2 per cent. of methyl alcohol cannot be distinguished from that obtained with pure ethyl alcohol. With percentages of methyl alcohol of 2 per cent. or over, however, the appearance, upon rotating the test tube, of reddish flocks, as described by Scudder (Journ. Am. Chem. Soc., 127, 892-906 (1905)), serves to indicate the presence of this alcohol, since with pure ethyl alcohol these flocks are not obtained.

Much better results have been obtained by oxidizing the mixtures of the alcohols with oxidizing agents like chromic acid or permanganate.

The first ones to replace the oxidation with a red-hot copper spiral by permanganate were Sanglé-Ferrière and Cuniassé (Ann. Chim. anal. appl. viii, 82), who used potassium permanganate for the oxidation. This method was modified by Scudder & Riggs (Journ. Am. Chem. Soc., xxviii,

1202), who proceed as follows: Add to the alcohol under examination 0.5 Cc. of concentrated sulphuric acid and 5 Cc. saturated solution of potassium permanganate. After two minutes sufficient sulphur dioxide solution is added to decolorize the liquid and the mixture boiled until the odor of acetaldehyde and sulphur dioxide has disappeared; then the resorcinol test is applied.

Fendler & Mannich (*loc. cit.*), later on used the following method: 10 Cc. of the liquid under examination are heated in a flask of 50 Cc. contents provided with a condensing tube, which is bent twice at an angle of 90° C. and has a length of 75 Cm., until 1 Cc. of the distillate is obtained. To this 4 Cc. of 20 per cent. sulphuric acid are added, and the mixture transferred to a wide test tube. With thorough cooling and constant shaking, one gramme of finely powdered potassium permanganate is then added. When the liquid is almost decolorized, it is filtered through a small dry filter into a test tube. The liquid is boiled for 20 to 30 seconds, cooled, and 1 Cc. of the decolorized liquid mixed with thorough cooling with 5 Cc. of concentrated sulphuric acid. To the cool liquid $2\frac{1}{2}$ Cc. of a freshly prepared solution of 0.2 Gm. of morphine hydrochloride in 10 Cc. of concentrated sulphuric acid are added, and the mixture allowed to stand for 20 minutes at room temperature. If the original preparation contains at least $\frac{1}{2}$ per cent. of wood alcohol the liquid is colored intensely violet or red-violet. Alcohol or mixtures of alcohol and ether may be examined directly without distillation; tincture of iodine is treated, before being distilled, with 5 Cc. of water and 2 Gm. of sodium thiosulphate; preparations containing ammonia have previously to be neutralized. This method is said to indicate methyl alcohol in the proportion of 0.5 to 1 per cent.

The oxidation of the mixtures of the alcohols by potassium chromate and chromic acid was introduced by Wolf (*Ann. chim. anal. appl.* 4, 183), whose method was later on modified by Trillat (*Compt. rend.* cxxvii, 237). This method depends on the formation of methylal when methyl alcohol is oxidized by potassium chromate and sulphuric acid, which gives, with dimethylaniline, tetramethyldiamidodiphenylmethane, a blue-colored substance.

Vorisak (*Journ. Soc. Chem. Ind.* xxviii, 823) proceeds, as follows: 0.5 to 1 Cc. of alcohol or alcoholic distillate is placed in a 6-inch test tube, 1 Cc. chromic acid solution is added and the mixture diluted to 4 or 5 Cc. After adding 2 or 3 pieces of pumice, the test tube is connected with a condenser of special design and distilled into another test tube. When 3 or 4 Cc. of liquid have passed over or when only about 0.5 Cc. remains, the condenser is detached and rinsed with about 2 Cc. of water into the receiving tube. To the distillate are added 1 drop of ferric chloride solution and two drops of albumin solution, and after mixing the liquid is underlaid with sulphuric acid. If more than 5 per cent. methyl alcohol is present

a violet zone appears at once. 1 to 5 per cent. is shown in one minute. Less than 1 per cent. requires several minutes. Ethyl alcohol gives no color. With organic impurities a yellow to reddish color is often obtained, but no violet. The color is intensified on warming.

By this test 0.001 Gm. methyl alcohol in 1 Cc. of the ethyl compound could be detected. The solutions used for this test are the following: Chromic acid solution containing 0.8 per cent. CrO_3 free from H_2SO_4 .

Albumin solution. White of one fresh egg mixed with 50 Cc. of water, filtered and preserved with a few drops of chloroform. Pure milk answers nearly as well. (5 drops.) Ferric chloride solution, 0.4 per cent.

Voisenet's (Zeitsch. Unt. Nahr. u. Gen. 1907, 653), method depends on the fact that formaldehyde gives in presence of an albuminoid and of hydrochloric acid containing nitrites a violet color. The same reaction is given by methylal and methyldiethylate, which products are obtained by the oxidation of methyl alcohol with potassium bichromate and sulphuric acid; while the oxidation products obtained from ethyl alcohol by this oxidation method do not give a coloration. He proceeds by diluting 10 Cc. of the liquid under examination to 50 c.c. with water, adding 5 Gm. of powdered potassium bichromate and 30 Cc. of 20 per cent. sulphuric acid and allowing the mixture to stand for one hour. Then 30 Cc. of the mixture are distilled, which are discarded. 4 Cc. of the next 20 Cc. of distillate are mixed with 0.1 Cc. albumin solution and 15 Cc. of hydrochloric acid containing nitrous acid.

The mixture is then shaken until the coagulated albumin is dissolved and then heated on a water bath to 50°C . If the alcohol to be examined contains methyl alcohol a violet color will be produced, varying in intensity with the amount of methyl alcohol present.

The albumin solution is prepared by beating the white of an egg with $\frac{1}{2}$ water, the hydrochloric acid containing nitrous acid by mixing 200 Cc. of hydrochloric acid with 1 Cc. of a $3\frac{9}{10}$ per cent. potassium nitrite solution.

Hinkel (Analyst. xxxiii, p. 417), replaces potassium permanganate and chromic acid with ammonium persulphate, and proceeds as follows: Add to 1 Cc. of the mixture to be examined, 0.8 Gm. of ammonia persulphate and 3 Cc. of dilute sulphuric acid (1 to 5) then make up to 20 Cc. with water and distil over 5 different portions of 2 Cc. each. The first two portions, which contain acetaldehyde, are rejected, the remaining three are tested for methyl alcohol by adding to the liquid a few drops of $\frac{1}{2}$ per cent. morphine hydrochloride solution and underlaying the mixture with concentrated sulphuric acid.

In case methyl alcohol is present a violet zone will be produced at the contact point of the liquids.

In this paper only those methods which have appeared since the publication of the U. S. P. have been described and tested, omitting those in

which the identification of the methyl alcohol depends on admixtures usually contained in methyl alcohol.

The experiments were confined principally to those methods in which the oxidation is carried out in acid medium with potassium permanganate, bichromate or ammonium persulphate. Our experiments have shown that the best and comparatively the simplest method is that of Hinkel, by which less than $\frac{1}{2}$ per cent. of methyl alcohol in ethyl alcohol can be proven. The reactions obtained by the other methods were more or less inconclusive. The method of Fendler & Mannich is uncertain and difficult to carry out, while with that of Voisenet we were unable to obtain any definite color reaction. While writing this paper an article appeared by Schmidt & Gaze (*Arch. d. Pharm.* 1909, No. 7), in which directions for the detection of methyl alcohol in galenical preparation (tinctures, fluidextracts, etc.) which contain volatile oils are given. For particulars the original paper should be consulted.

Since the writing of the above paper an article translated from the Polish of A. Bukowski has appeared in the *Pharmazeutische Post* (XLIII, No. 14, Feb. 18, 1910), in which the author reviews the various methods for the identification of methyl alcohol, and recommends a modified form of the Fendler-Mannich method. He proceeds as follows: 2 to 3 Cc. of the liquid are mixed with 10 Cc. of 15 per cent. sulphuric acid and the mixture cooled with ice. Then potassium permanganate is added in small portions (.1 to .2 Gm.) and shaken well after each addition. After a slight pinkish color remains permanent the turbid liquid is filtered several times through a small filter until a perfectly clear or slightly reddish filtrate is obtained. The decoloration may be facilitated by gentle heating, and if the liquid should again become turbid it is filtered again through a filter. For the detection of the formaldehyde the morphine-sulphuric acid reaction is used and in addition to that the method originated by Mentzel: Add to 1 Cc. of the mixture .01 Gm. of phenylhydrazinehydrochloride and shake until the latter is dissolved. Then add one drop of a 10 per cent. iron chloride solution and finally 10 to 15 drops of concentrated sulphuric acid, when in presence of formaldehyde a carmine-red color will be produced.

We have tried this method, but the results obtained were inconclusive and quite as unsatisfactory as those obtained by the Fendler-Mannich method.

LABORATORY NOTES ON THE PHARMACOPEIA.

JOHN R. RIPPETOE.

It is a proverbial saying that practice makes perfect, and it might just as truly be said that criticism and suggestion (help to) make perfect. The past few years have seen many comments on the 8th Revision of the Pharmacopœia, especially as to the standards and assay processes. They

have been criticised, changes advised and entirely new methods and standards suggested. This paper will do a little of each.

It has been said that the Pharmacopœia went into too much detail in outlining some of the methods. With these statements I wish to disagree, for it is lack of detail in many cases of minor importance probably, but still sufficient for two chemists working in different laboratories, or in fact in the same laboratory, to obtain entirely different results, due to their interpretation of the methods and in applying the same. Many standards are left entirely to the judgment of the analyst, such as "a faint turbidity," "moderately cool place," or "a very slight residue."

It is true the Pharmacopœia is not a text-book, but no matter how well the analyst may be trained in other lines of chemical analysis, he will apply his own methods of manipulation, where the method is not clearly outlined. When he assays opium for example, how vigorously will he agitate the flask every 10 minutes, how will he transfer the opium to the flask for the second maceration, how will he evaporate carefully, and what is a moderately cool place? It is very doubtful if the analyst agitating the flask every 10 minutes will get the same result as the analyst using a mechanical shaker.

The following notes are taken from the writer's laboratory note-book, and are observations made in conducting the routine work of the analytical laboratory of a pharmaceutical manufacturing house.

Tartaric Acid.—We have examined a number of samples, but recall only one sample that was entirely free from sulphuric acid. The U. S. P. limits this impurity and requires that an aqueous solution 1-10 should "show but a faint turbidity." In our opinion we have had a great many samples that showed what we considered much more than a "faint turbidity." I think it would be much more satisfactory to make this test quantitative, determining by comparison with a standard sulphuric acid solution. The amount present is small and may not affect the medicinal value, but causes sufficient difference of opinion to make trouble.

Dilute Hydriodic Acid.—The comments under tartaric acid would apply to this preparation, as to the limit of sulphuric acid.

Aconite.—In the assay of this drug it would be much more practicable to exhaust the drug with ether or a chloroform-ether mixture, either complete or using an aliquot portion, since with the present U. S. P. method powdered aconite requires considerable time to exhaust with a menstruum of alcohol and water, owing to the very slow percolation, and the subsequent evaporation is very likely to cause decomposition of the unstable alkaloid aconitine.

Filtering the acid mixture of the evaporated residue through filter paper is very tedious. We find that by filtering the liquid through cotton, and then washing the acid solution with ether, and rejecting the ether, expedites the manipulation of the assay. The ether solution of the extracted alkaloid

should be decanted into another vessel before evaporating, leaving any water that may have collected behind. Rinse the vessel with several small portions of ether, and add to the original solution. This precaution should be applied to all ether solutions of alkaloids, as it is almost impossible to avoid a few drops of water getting in from the stem of the separator.

As to washing the acid mixture with ether and rejecting the ether, I find it a great advantage to wash all acid extractions with a portion of the volatile solvents being used, and rejecting previous to rendering alkaline for the final extraction of the alkaloids. This is of special advantage in the assay of the leaf drugs like belladonna, hyoscyamus, coca, etc., and their preparations, where some coloring matter may have been held by the acid solution due to an emulsion or not a perfect separation.

Balsam Peru.—Owing to the sodium hydroxide solution dissolving a portion of the ether, the results obtained for cinnamein content are usually higher than the amount actually present. Weighing off 5 1/2 grammes of ether is also a very tedious process, especially if the room is very warm. This process can be simplified by completely extracting the sodium hydroxide mixture with several portions of ether. Following out this method will give about 5 per cent. less cinnamein than the U. S. P. method, but a more correct determination of the amount present. Gentle heat should be stated "at any temperature between 32° C. and 38° C.," for many may not know the term is defined on page liii. The temperature is very important.

Capsicum.—We have examined samples of this drug for alcoholic extract, and have found several that contained less than 12 per cent., while an average sample should contain at least 20 per cent.; showing a possible partial removal of the alcohol-soluble matter. It would seem desirable to have an alcoholic extract standard or some such test for this drug.

Yellow Wax—Beeswax.—Determining the saponification value in the presence of paraffin adulteration, the heating should be done by boiling at least one hour with the flask connected with a return condenser, otherwise the value found is likely to be too low and variable, owing to incomplete saponification.

Coca.—Very few samples of this drug assay less than 0.8 per cent. ether-soluble alkaloids, therefore, it might be advisable to raise the standard from 0.5 per cent. to 0.8 per cent. We have had samples of Truxillo leaves assaying as high as 1.2 per cent. of the ether-soluble alkaloids. The assay process is somewhat simplified by using 5 grammes of the drug instead of 10, as the exhaustion of the drug with the ether chloroform mixture is much easier accomplished.

Cocaine Hydrochloride.—The melting-point requirement for this drug should be deleted from the U. S. P., as there is practically no true melting point; it is, more properly speaking, a decomposition point, which depends entirely upon the rapidity of heating the sample. Under the test for

limit of cinnamyl-cocaine, 3 drops of $\frac{N}{10}$ potassium permanganate should be changed to read 0.18 (0.185) Cc., since 3 drops is an indefinite amount. Also, under test for limit of isatropyl-cocaine, 4 drops of ammonia water should be changed to read 0.25 (0.245) Cc., and cold distilled water should be described by a definite temperature. We are in the habit of using water at 15 degrees centigrade. A six-ounce wide-mouth bottle is to be preferred to a beaker in carrying out this test.

Cresol.—The required specific gravity for this article, namely 1.036 to 1.038 is within too narrow limits. I note 17 samples having the following densities at 25 degrees C., 1.034, 1.0348, 1.0385, 1.0336, 1.0324, 1.0331, 1.0332, 1.0345, 1.0360, 1.045, 1.032, 1.050, 1.038, 1.0376, 1.0344, 1.031, and 1.0385.

The lower densities indicate the presence of meta or para cresol, and since meta cresol is considered the most valuable of the three as a germicide, it would seem the lower gravity cresol would be preferred. Very few of the above samples were soluble in 60 parts of water.

Reduced Iron.—The assay process for this preparation is not satisfactory since it is inclined to give low results, owing to the iodine not completely dissolving or acting upon all of the iron.

Fluidextract of Aconite.—The comment under aconite as to filtering the acid mixture from the evaporated residue and washing with ether, applies to this preparation.

Fluidextract of Gelsemium.—This preparation should have an alkaloidal standard and assay process for determining the same. The following method based upon Webster's method has given very satisfactory results. Transfer 15 Cc. of the sample to a 200-Cc. measuring cylinder, add 10 Cc. water, 5 Cc. sodium hydroxide T. S. and 150 Cc. chloroform-ether mixture 4-1. Shake the cylinder frequently during one hour, set aside and when the chloroform-ether layer has become clear, note the volume, and draw off two-thirds, representing 10 Cc. of the sample. Transfer to a separator and extract the alkaloids with 1 per cent. sulphuric acid; make the acid solution alkaline with sodium hydroxide T. S., and extract the alkaloids with chloroform-ether mixture 4-1, finally extracting the alkaloids from the volatile solution with 5 Cc. $\frac{N}{10}$ sulphuric acid diluted with 10 Cc. water, shaking the separator for two minutes, and after drawing off the acid solution, wash the volatile solution with several portions of water, finally collecting the acid solution and washings and titrating excess acid with $\frac{N}{10}$ potassium hydroxide, using about 20 drops cochineal indicator.

Fluidextract of Ipecac.—The comment under fluidextract of aconite applies to this preparation.

Fluidextract of Nux Vomica.—It is more practical to transfer the 10 Cc. of sample to a separator, add 4 Cc. ammonia water, and extract with chloroform and proceed according to the U. S. P. method, than to evap-

orate to dryness, etc., as directed. I find the use of sodium nitrite or nitrous acid the only practicable way of completely oxidizing the brucine.

Fluidextract of Pilocarpus.—The assay process for this preparation is needlessly complicated, since, as satisfactory results can be obtained by extracting 10 Cc. of the fluidextract directly with chloroform, after the addition of 2 Cc. ammonia water, and continuing as under the U. S. P. process. The sand and extract residue is very tedious to transfer from a dish to a flask, and the chloroformic extraction of the residue is likely to prove troublesome owing to emulsification.

Fluidextract of Podophyllum.—This preparation should have a resin standard and assay process for determining the same. A chloroformic extract standard would possibly be the most practicable.

Fluidextract Sanguinaria.—This preparation should have an alkaloidal standard and assay process for determining the same.

Glycerite of Hydrastis.—This preparation should have an alkaloidal standard and assay process for determining the same. The U. S. P. method for fluidextract of hydrastis is a satisfactory method.

Oil of Cajuput.—The assay process for determination of cineol is very unsatisfactory. We have found the resorcin method as proposed by Schimmel & Co. (Report Schimmel & Co., Oct., 1907, p. 47) or A. Ph. A. Proceedings, 1908, p. 324) very satisfactory, and think it would be a more desirable method than the present one.

Oil of Cinnamon.—Oil of cinnamon and oil of cassia should be considered as two distinct oils, since these two oils are distinguished commercially, the former being about ten times more expensive than the latter, and consequently subject to adulteration with the cheaper variety. Oil of cassia is darker in color, the odor less delicate and the specific gravity often exceeds the limit 1.055 at 25° C.

Oil of Eucalyptus.—The comment under oil of cajuput applies to this oil.

Oil of Lavender Flowers.—An optical rotation standard should be given for this oil. We have examined samples of this oil that complied with the U. S. P. requirements, but were dextrogyrate and of inferior odor, while oils of a desirable odor were always lævogyrate.

Oil of Peppermint.—The test for absence (?) of dimethyl sulphide should be changed from after a "short time," to after ten minutes. Oils that are known to be rectified will give a white film if allowed to stand long enough, and a "short time" is somewhat indefinite.

Cod Liver Oil.—Under iodine value 0.3 Gm. should be changed to 0.2 Gm., since 25 Cc. of the iodine mixture is not sufficient when 0.3 Gm. of the oil is taken, and is inclined to give results that are too low.

Oil of Tar.—The specific gravity for this oil is too low. The following six samples were claimed by the distillers to be the best they could produce.

Specific gravities respectively 0.9582, 1.0340, 0.9943, 0.9749, 0.9574, 0.9897. It would seem desirable to go back to the old standard or better yet have a high and low limit.

Oil of Turpentine.—The test for absence of petroleum benzin, kerosene or similar hydrocarbons is not satisfactory, as the layer in samples known to be pure will measure more than 0.35 Cc.

Opium.—In the assay of this drug agitating the flask every 10 minutes during 3 hours does not prove very satisfactory, as the results are usually lower than may be obtained by the use of a mechanical shaker. A laboratory that has much alkaloidal assay work to do, should be provided with a mechanical shaker if it is desired to obtain a thorough agitation of the flask. It is also a great time-saver.

It is more expedient to transfer both filter and moist opium back to the flask and use a new filter for the second filtration. It should cause no trouble by increasing the bulk in the second filtration if a light filter paper is used. Careful evaporation is accomplished on a water-bath containing boiling water. A moderately cool place is obtained by using an ice box (refrigerator), which gives a temperature ranging between 10–15° C. A temperature above this should be avoided, as it is inclined to cause a heavy deposit of impurities.

Pancreatin.—Owing to the variable composition and freshness of milk, determining the converting power is not very satisfactory. It would seem advisable to remove this test from the Pharmacopœia. The starch should be more clearly defined by stating the kind of starch to be used, although corn starch is possibly understood.

A method for drying the starch should be given, or possibly better use moist starch allowing for the moisture present previously determined by drying in a current of dry air. Two drops of $\frac{N}{10}$ iodine, should be changed to read 0.12 Cc. and four drops of the warm converted starch solution to read 0.25 Cc. since two and four drops are indefinite amounts.

Pepsin.—Owing to the variable composition of eggs, it is an advantage to use a standard pepsin for carrying out a blank assay on the coagulated albumen, in determining the proteolytic power of the sample under examination.

The standard pepsin is obtained by testing it on several different eggs, and requiring that it should not leave a deposit of undissolved albumin measuring more than 1 Cc. on a majority of the eggs; hence, if the sample is found to leave a deposit measuring 2.5 Cc., and the standard pepsin leaves a deposit measuring not less, the sample is passed as satisfactory.

Compound Effervescent Powder.—This is a very extensively used preparation, and it would seem desirable to have an assay process for determining the presence of the proper amount of potassium and sodium tartrate. The following method gives very satisfactory results. Ignite one Gm. of the powder, representing the potassium and sodium tartrate

and sodium bicarbonate mixture, thoroughly at a red heat, and extract the residue with boiling distilled water until the washings cease to react with methyl orange T. S. The mixed filtrate and washings should require for complete neutralization, not less than 16.2 Cc., nor more than 16.8 Cc. (16.5 Cc.) $\frac{N}{T}$ hydrochloric acid.

Soft Soap.—The test for limit of free alkali gives variable results, depending upon the length of time in obtaining the aqueous solution, temperature and amount of phenolphthalein indicator added. If, after the apparent discharge of the red tint has been obtained, two more drops of indicator are added, the red tint appears again and will reappear each time more indicator is added. A more satisfactory determination is obtained by dissolving 5 Gm. of the sample in 50 Cc. of neutral ethyl alcohol, then adding 25 Cc. of water, and stirring thoroughly to take up any insoluble residue. 1 Cc. of phenolphthalein indicator is then added and sufficient $\frac{N}{10}$ oxalic acid to discharge the red tint, which should not reappear upon the addition of more indicator. This preparation should be required to contain not less than 40 per cent. fatty acids, and a test should be given for determining their source, as cottonseed oil is extensively used in making this soap.

Spirit of Ammonia.—The specific gravity of this preparation should be taken at 15 $\frac{1}{2}$ ° C., as it is almost impossible to take the specific gravity at 25° C. by means of a pycnometer at least, owing to the liberation of ammonia gas at the higher temperature.

Sugar of Milk.—The test for absence of cane sugar remains very unsatisfactory. One Gm. of the sample will leave more than 0.03 Gm. of residue indicating the presence of cane sugar, but negative results are obtained when other tests are applied. The following test will show the presence of less than 1 per cent. of cane sugar. Mix 2 Cc. each of oil of sesame and hydrochloric acid, to which add 0.5 Gm. of the sample and shake for 30 seconds. A distinct red color, which may require a few minutes to develop, indicates the presence of cane sugar.

Terebene.—Absence of more than a trace of resinous substances should be determined quantitatively. I note four samples containing respectively 1.69, 1.79, 0.92, and 1.60 Gm. in 100 Cc. Is this a very slight residue?

ADULTERATION OF VEGETABLE DRUGS.

A SUMMARY.

BY ALBERT SCHNEIDER.

When the Federal and several State pure drug laws went into effect it was confidently expected that there would be a very appreciable falling-off in the adulteration of drugs of all kinds. It was believed that gross criminal adulterations would be rare occurrences indeed. In this our fond hopes are experiencing a great disappointment, for drug adulteration is at

this time practiced to an alarming degree. This is certainly true as far as vegetable drugs are concerned. It is true that the pure drug work and the administration of the pure drugs laws is as yet in its infancy. It was, however, believed that the knowledge of the existence of such laws would act as a check upon the work of those criminal defectives who deliberately adulterate articles intended for the relief of suffering mankind. But such is evidently not the case. In passing it may be remarked that one cannot readily conceive anything more ridiculous and farcical than the hearings on drug adulteration before a police justice.

The following summaries are based upon the personal microscopical examination of crude and powdered vegetable drugs and spices in the Federal Laboratory of San Francisco, the State Laboratory in Berkeley and in the Botanical Laboratories of the California College of Pharmacy. The time covered in this work was from October 1, 1908 to May 1, 1910, or a period of one year and seven months. In all some 1160 samples were examined, grouped as follows :

- Group (1) 150 samples of vegetable drugs in the State Laboratory.
 " (2) 350 samples of spices in the State Laboratory.
 " (3) 300 samples of vegetable drugs in the Federal Laboratory.
 " (4) 360 samples of vegetable drugs and spices in the laboratories of the California College of Pharmacy, making the total of 1160 samples.

Group (1) consisted of samples taken from retail pharmacists and wholesale drug dealers in and about San Francisco. The samples of group (2) were taken from the retail and wholesale spice dealers throughout the State of California. In group (3) the samples were secured from well-known Eastern drug importers, and in group (4) the samples were in part taken from retail druggists, some were supplied by wholesale drug dealers and a few samples of spices were obtained from retail grocers and from private families ; all in and about San Francisco.

The following are the percentages of adulteration found :

Group (1), percentage of adulterated samples was.....	38.50.
" (2), " " " " " "	37.6
" (3), " " " " " "	50.
" (4), " " " " " "	35.8

The findings in group (3) are especially interesting as well as surprising and the above figures indicate in a way the terrible condition of affairs that confronts us. The results will serve to emphasize the importance of the work that lies before the committee on drug reform.

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SOME OBJECTIONABLE AND UNUSUAL CHINESE DRUGS IMPORTED
INTO THE UNITED STATES.

BY ALBERT SCHNEIDER.

I. INTRODUCTION.

Many of the ways of the Chinese impress us as being peculiar. This certainly applies to their practice of pharmacy and medicine as has been more fully explained elsewhere.* The quantity and variety of Chinese drugs imported into the United States via San Francisco is very great and is apparently wholly out of proportion to the reasonable needs of the sick of the Chinese population of the United States. It is, however, probable that said drugs are not all used by the Chinese. Within recent years many of the Chinese doctors are making very persistent efforts to extend their practice among Americans, as is evidenced by their extensive advertising in the daily papers and their use of large painted poster ads. in the larger cities of the Pacific Coast, especially in San Francisco and Los Angeles. The special features of their medical advertising are that they use harmless herbs only, cure without the use of the knife and that their superior medication is the result of the accumulated experiences of many centuries. Their American patrons are from the ranks of the uneducated, the easily beguiled, those who are easily humbugged, those who are after something new. Most of the patients are women, although there are also men who visit these Oriental doctors. It may be also stated that the advertising Chinese doctors belong to the better class, judged from the Chinese viewpoint. From the viewpoint of Western scientific medicine they are mere charlatans. It is also a fact that most of the advertising Chinese doctors belong to the old school which is wholly without scientific foundation. Chinese doctors who are graduates of the Western schools of medicine do not advertise, as the universally recognized code of ethics of the regular schools of medicine does not permit it..

The old-school Chinese doctors or herbalists claim to use some three thousand different herbs of tried value, besides many minerals and drugs of animal origin. Some of the latter are very unusual as well as nauseous, and highly objectional for sanitary reasons. This paper will, it is hoped, serve to point out the possible dangers which may lurk in certain Chinese drug imports. It is a fact that the Chinese have no true conception of Western sanitation or of disinfecting and safeguarding against infectious and contagious diseases. The occurrence of small-pox, plague, cholera and other dangerous infectious diseases, is chronic throughout the Chinese empire and every effort should be made to prevent the importation

* Chinese Drugs and Medicine in San Francisco, *Pacific Pharmacist*, 2; 196-204. Notes on the Chinese Materia Medica of San Francisco. *Proc. A. Ph. A.* 57: 852-858. 1909.

of articles which may serve as carriers and disseminators of the above-named infections. The publication of the partial list of offensive drugs will, it is hoped, tend to discourage those who show such a decided preference for Chinese doctors and their medicines.

It is further hoped that a fuller knowledge of those articles will bring about a Federal enactment prohibiting the importation of undoubtedly objectionable drug articles.

The list of so-called remedies is given in alphabetical order according to common English names, numbered consecutively for convenience of cross reference. At the close is given an alphabetical list of Chinese names (English equivalents) in the Mandarin dialect, with cross reference to English names by number. This list will prove of value to port inspectors and floor examiners who desire to identify such articles.

It must also be explained that the drugs cited are mostly crude. Thus far it could not be ascertained to what extent these articles, in powdered or other form, occur in compound powders, in pills, in tablets, in plasters, in liquors, in aquae, etc., prepared and prescribed by the Chinese doctors. With increasing experience the writer is less and less willing to make organoleptic tests of Chinese pills, powders, tablets, compound teas, etc., submitted for entry at the San Francisco port, because one may never know what particular nauseous ingredients may be present. The writer has also been cautioned by Chinese friends against the promiscuous sampling of drugs, it being declared that some are "very potent."

Some of the packages containing certain of the offensive drugs actually swarm with insect life and absolutely no attempt is made to isolate these packages from those which contain harmless drugs or even food materials that may be included in the same box or bale.

A few of the more offensive Chinese drugs were examined bacteriologically in the laboratory of the U. S. Public Health and Marine Hospital Service, San Francisco, and it was reported that they were sterile as far as pathogenic or otherwise dangerous germs were concerned, excepting the somewhat doubtful finding of a single colon bacillus in one of the articles. Even though the particular samples examined appeared to be harmless, that is absolutely no indication that other samples are also harmless. The following diseases could no doubt be introduced in the following so-called drugs presented for entry at the port of San Francisco:

1. Bubonic plague, in rats' dung and fleas. Whether or not the plague can be imported through these sources is questioned. We can nevertheless ill afford to take chances.
2. Asiatic cholera, in human fæces.
3. Intestinal diseases, including typhoid fever, in human fæces and other similar filth.
4. Skin diseases, in animal hides.
5. Small-pox, in a variety of articles which have been in contact with

individuals having small-pox or just recovering from an attack. Small-pox epidemics occur sporadically throughout the Chinese empire.

Animals, dried and pickled, bones and tissues, animal skins and hides carry various parasites causative of systemic as well as local diseases, unless such articles are thoroughly sterilized or disinfected, which the Chinese certainly do not do as far as can be ascertained.

The following germs of diseases and other causes of disease are always passed in the stools of those suffering from the diseases: typhoid fever, Asiatic cholera, amœbic dysentery, bacillary dysentery, intestinal tuberculosis, bubonic plague, cholera infantum, anthrax, small-pox, measles, scarlet fever and chicken-pox. The larvæ and eggs of tape-worm, pin-worm, hook-worm, etc., occur in the stools. Urine carries pathogenic germs and their spores besides other disease-producers.

With these introductory remarks we shall cite a partial list of the more offensive articles submitted for entry at the port of San Francisco, hoping that the report may influence the members of the American Pharmaceutical Association and induce them to frame resolutions recommending that the importation of offensive, putrid and otherwise objectional drugs be prohibited.

II. ALPHABETICAL LIST OF UNUSUAL OR NAUSEOUS CHINESE DRUGS PRESENTED FOR ENTRY AT THE PORT OF SAN FRANCISCO.

(1) *Alligators' Scales.* Shan kea me.

Used medicinally, but in what manner is not explained. Scales imported in considerable quantity.

(2) *Alligators' Hide.* Shan kea.

Alligators' skin and muscle attached is imported for medicinal use. Cut into strips about ten to fourteen inches long, and dried.

(3) *Armadillo Skin.*

Said to be used medicinally, but just how could not be ascertained. Not seen or not recognized.

(4) *Asses' Glue.* O Keaou. Luh Keaou.

A glue made from the hide of various animals, but especially the ass. To make the glue especially efficacious the animals must have obtained their drinking water from a certain well in the Shantung province, hence the Shantung glue brings the highest price. This glue is essentially a woman's remedy and is used almost solely in diseases of women. Astringent, sedative and tonic properties are ascribed to it.

(5) *Barley Sprouts.* Mei ya.

Used as a stomachic and as food.

(6) *Sprouting Rice.* Kuh ya.

Is similarly used. Given to children to relieve the symptoms of over-eating.

(7) *Cow Bzoar.* New hwang.

Concretions found in the gall bladder of the cow. Used as a sedative and tonic, in ulcers, inflammations. External application with camphor. Imported in considerable quantity. Expensive.

(8) *Bats' Dung*. Way ming sha.

The undigested parts (especially the eyes) of insects eaten by bats, such as fleas and other insects. These particles are carefully picked from the dung. Used as a decoction in the treatment of inflamed eyes. Boil one-half ounce in a cupful of water, strain and drink this amount once daily until cured. Imported.

(9) *Beetles*. Tang lang.

Resemble the rhinoceros beetle in India. Dried, powdered and used in plasters for sores, ulcers, etc. Not seen in the entire state.

(10) *Biche de mer*. Hae san.

A marine sea slug or holothurian. Used as food and reputed to have aphrodisiac or tonic properties. Imported. There appears to be considerable confusion as regards the Chinese terms applying to remedies which serve as general tonics and those which have aphrodisiac properties. The general report that the Chinese use aphrodisiacs very extensively is strangely denied by good Chinese authorities who state that this misconception is due to the fact that the Chinese name for "tonic" is often strangely interpreted as "aphrodisiac."

(11) *Boa Constrictor Skins*. Num shea pe. Foo shea pe.

The dried skin is used externally. Applied to sores, ulcers, etc. Useful in rheumatism. Imported.

(12) *Buffalo Horns*. Gu kak.

Used to same extent as a medicine in blood troubles. Not seen.

(13) *Carriion Beetles*. Tang lang. Tumble bugs. Tumble Dung.

A black beetle of the Scarabaeidae (*Coprobious*) not unlike our tumble bug. Odor very strong.

(14) *Dragon Fly*. Tang lang.

Used as a general tonic and in the treatment of genito-urinary diseases.

(15) *Cantharides*. Red, green and ordinary.

Used for blistering purposes. The red is not a cantharides, it is *Heuchys sanguinea* (40). Imported.

(16) *Centipedes*. Woo kung.

These are dried and neatly mounted upon bits of bamboo. The powder is applied externally in venereal diseases, especially to primary and seconded syphilitic sores. Imported in small quantities.

(17) *Chamois Horns*. Ling yang.

The horns of a small species of antelope found on the plains of Mongolia. Used as a cooling medicine, particularly efficacious in inflammation of the lungs and the liver. The shavings (ling yang peen) are imported. The Chinese consider the tip of the Chamois horn the hardest substance in the world.

(18) *Cicada Shells*. Chen Kho.

The cast-off shells of the cicada. A decoction is given to children in indigestion, convulsions, fever, etc. Considered a specific in cataract when given internally. Imported in large quantities.

(19) *Cocoons*. Sang peaou shaou.

Used medicinally in amenorrhoea. Applied to sores, ulcers and boils. Imported.

(20) *Old Copper Coins*. Koo tung tseen.

Boiled in water to obtain the verdigris. Coins are also boiled in vinegar. Made into an ointment. Useful in skin diseases, dysentery, eye diseases, applied to sores, etc. The coin not seen.

(21) *Cow Glue*. New keaou. New pe keaou.

A glue made from cowhides, boiled and dissolved in warm water. Used in hemorrhages and in urinary disorders. Much used by the women as a tonic, taken on an empty stomach in the morning. Glues of various kinds are extensively imported.

(25) *Cows' Horns*. New Kak sae.

The inner casing (marrow) of cows' horns. Boiled in sesamum oil and made into plasters, which are applied to sores and ulcers. A decoction of horns is taken internally as a strengthening tonic or medicine.

(23) *Cow Sinews*. New kin.

Prepared and used like deer sinews. Deer and cow sinews are imported in considerable quantity.

(24) *Crickets*. Seih sub.

The fighting crickets are used, both male and female. A decoction is given for the purpose of purifying the blood, to cause boils to disappear and to hasten suppuration. Imported.

(25) *Cuttlefish Bones*. Woo tseh küh.

The calcareous substance commonly known as cuttlefish bones is boiled. Said to have cooling properties; used in gonorrhoea as a vermifuge, in ulcers, boils, sores, burns; in diseases of the eye, hemorrhage, etc. Imported.

(26) *Deer Horn Shavings*. Luh keo peen.

Very thin, flexible, brittle shavings of the newly growing horns. Diaphoretic and stimulant. Given in nervous complaints. Extensively imported. Expensive.

(27) *Deer Sinews*. Lüh kin.

Said to be boiled with eggs, shrimps and other food substances, taken by invalids as a great restorative tonic. Imported.

(28) *Dragons' Bones*. Lung küh.

Fossil ivory, occurring in irregular pieces, weighing perhaps a few ounces. Ground to a fine powder, used in fever and ague, chorea and spermatorrhoea.

(29) *Dragons' Teeth*. Lung ya.

Various substances are comprised under this name as the fossil teeth of *Stegodon sinensis* and of *S. orientalis* (extinct elephants), horns of *Calicotherium sinense*, the teeth of *Hyla sinensis*, the molars of mastodons, elephants, sheep, teeth of hippotherium and perhaps of other animals, modern and extinct. Reduced to a powder and used as a restorative tonic, as a sedative or cordial. Imported.

(30) *Earth Worms*. Keuh shen.

Used as a vermifuge, in colds and fevers, to relieve retention of urine; externally in the treatment of bites, sores, ulcers in ear, eye and mouth troubles.

(31) *Eel's Blood*. Shen yu heuē.

The eels are placed alive in cold water and gradually brought to the boiling temperature. They are then taken out and the long intestine containing the blood is removed and dried. Used in sunstroke. If applied to the side of the face not affected it is said to give instant relief and cause the face to assume its normal appearance. The fresh eels' blood is more efficacious than the dried. Also used in ringworm, and in mouth, ear, eye and nose treatment. Not recognized.

(32) *Egg Skins*. Phoenix Skins. Fung hwang e.

The egg skin taken immediately after the chicken is hatched. This is dried, powdered and mixed with safflower, ginseng, and dates and given in jaundice. Imported.

(33) *Eggs of Silkworm*. Tsan tsz.

The dried eggs of the silkworm are used in the treatment of smallpox. Not seen.

(34) *Elephants' Hide*. Seang pe. Sai pe.

Used as an application to fresh cuts and wounds. Also used as a tonic. Only the shredded hide was seen (Cheow pway). Imported.

(35) *Human Excrement*. Jin hwang.

Dried, in irregular pieces, cut into uneven cubes and formed into cakes the size of small ginger snaps. Apparently unprepared and unmixed with anything else, the natural odor being very pronounced in the samples thus far found. Samples examined bacteriologically in the laboratory of the U. S. Marine Hospital Service, San Francisco, gave negative results. Said to be useful for bites, burns, ulcers and to counteract poisons; useful in hemorrhages, fevers, dyspepsia, etc. Imported.

(36) *Prepared Human Excrement*. Jin chung hwang.

Equal parts of human excrement, licorice, bran and other ingredients mixed, decocted and rammed into hollow bamboo stems and the ends hermetically sealed; then boiled for a long time. According to some no human excrement is added, but the mass in the bamboo is placed in the privy for a time, soaked in the mixture of faeces and urine; then removed, dried and boiled, as above.

(37) *Fish Glue*. Ye keaou.

Used medicinally and for gluing purposes. Imported.

(38) *Fish Stomachs*. Fish Bellies. Yu tu.

The dried lower belly of several species of large fish, eaten and used as a tonic medicine. Not seen (?)

(39) *Black Flies*.

Glossy black flies, somewhat larger than a bumble bee, resembling a wasp. Use not determined. Imported.

(40) *Red Flies*. Red blistering beetle. *Heuchys sanguinea*.

Not a blistering beetle. Properties and uses not ascertained. Imported.

(41) *Pickled Domestic Fowl*.

Plucked, and prepared in some kind of brine. Odor bad, recalling the dissecting room.

(42) *Frog Medicine*. Tsan soo. Chan su.

Made from frogs and considered very useful in the treatment of catarrh, in intestinal troubles, worms, etc.; as a diuretic, sedative, etc. Not seen.

(43) *Dried Frogs*. Tin gi.

Dried frogs (single, not in pairs) on bamboo frames are imported. Use not determined.

(44) *Burnt Ginger*. Keung hon.

Common ginger burnt until almost wholly charred. Given as a last resort in fatal sickness. (Dr. Leung.) Imported in considerable quantity.

(45) *Gizzard Membrane*. Ke chun pe.

The lining membrane of the gizzard of the domestic fowl peeled off and dried. The membrane from the male fowl is used for female patients and *vice versa*. Used in dyspepsia, diarrhoea, spermatorrhoea and in urinary complaints. Practically identical with the *Pelliulæ stomachi galliæ interiores* of the London Pharmacopœia (1721) and similar to the *Ingluvin* of modern materia medica. Not seen.

(46) *Hedgehogs' Skin*. Tsze wei pe.

The dried skin of the common hedgehog. The decoction is taken in pulmonary complaints. The powder in pills is taken for skin diseases. May carry skin diseases. Imported.

(47) *Red Hematite*. Chay shih.

Used as a cordial and tonic and as a pigment. Imported.

(48) *Parasitized Insect Larvæ*. Tung Chung hae tsaou.

A peculiar nature freak. The larvæ of the insects are attacked by a fungus and gradually killed. Finally the entire substance of the larva is replaced by the mould tissue, retaining the exact form of the larva. A spore-bearing stipe develops from the head of what was originally the insect. Some years ago this freak excited considerable curiosity among botanists. Also obtained from Australia. Use not determined. Imported in considerable quantity.

(49) *Insect Skins*. Chen tuy.

Used medicinally. Imported.

(50) *Ivory Shavings*. Seang ya seao.

Decocted. Cooling and tonic. Given to weakly children who have a tendency to spinal troubles. Not seen.

(51) *Lizards*. Peih hoo.

The common spotted house lizards of China. Dried, powdered and used as an ingredient in plasters for sores, ulcers, wounds, etc. They are very extensively imported, neatly dried over a bamboo frame, always in pairs, male and female. The Chinese have great faith in the proper combination of the male and female principle (the *yang* and the *yin*). A tea is made by dipping the lizards in boiling water. The pair of lizards is thus used over and over. Tonic.

(52) *Dried Lecches*. Shwuy chih.

Made into a decoction when required, either in water or Chinese gin or brandy and taken internally as a purgative. Also applied externally to bruises.

(53) *Leek or Garlic Seeds*. Kew tsae tsze.

Boiled in spirits and taken internally for rheumatism, neuralgia and other pains. Imported.

(54) *Maggots*. Woo kub chung.

Collected from water closets, dried and powdered. A decoction is given to children suffering from over-eating. Acts as a mild purgative. A filthy substance the use of which is wholly foreign to the modern conception of sanitation. Not discovered.

(55) *Manis Scales*. Chuen shan kea.

Decocted and given in venereal diseases. Not seen (?).

(56) *Mylabris cichorii*. Pan maou. Chinese blistering beetle.

Said to be very efficacious in the treatment of hydrophobia. Imported.

(57) *Rabbits' Dung*. Wany yue sha.

A decoction is used in the treatment of asthma. Imported.

(58) *Rats' Dung*. Leang tow tseen.

Dried and powdered. Applied to sores and ulcers.

(59) *Rhinoceros Hide*. Se pe. Sai pe.

Boiled into a jelly and given as a tonic. Imported.

(60) *Rhinoceros Horns*. Se keo. Sai kok.

Used as a strengthening tonic and as an antidote to poisons. Considered of great value. Also used as cups, cornucopias, etc. Flamed or shaved up very fine and made into a decoction. Taken in small quantities. Imported.

(61) *Rhinoceros Horn Shavings*. Se keo peen.

Decocted or boiled to a jelly. Cooling and strengthening. Given to women in child-birth. Not seen.

(62) *Scorpions*. Chuan hee.

A variety of true scorpion, about two inches in length, dried and usually heavily salted. Coolies eat them raw and alive. Considered of great value as a diaphoretic in fevers and serious diseases. Given to teething children. Imported.

(63) *Scouring Rush*. Muh tsee tsaou.

A decoction is taken internally for weak and sore eyes. Imported.

(64) *Sea Horse*. Hae ma.

A decoction is used in female disorders. Said to be strengthening. Imported.

(65) *Black Shark's Fins*. He yu chih.

Used as food and as a tonic stimulant. Imported.

(66) *White Sharks' Fins*. Peh yu chih.

Used as food and as a tonic stimulant. Imported in large quantities.

(67) *Sheeps Entrails*. Yang chang.

The intestines of the sheep used in the manufacture of bowstrings; also used medicinally. Not seen.

(68) *Shells*. Wa lang tze (cockle shells) Han lo kho (Snail shells), Ho le kho (clam shells), Mow le kho (oyster shells).

Broken and decocted; also powdered. An ingredient in plasters for sores and ulcers. Imported.

(69) *Dried Silk Worms*. Tsan chung and other names.

The larvæ of the silk moth, powdered and decocted, given to children for colds, fevers, etc. An infusion is used as an eye wash. Imported.

(70) *Silk Worm Pupa*. Keang tsan.

Used medicinally, but just how was not explained.

(71) *Green Snakes*. Taing seaou shay.

Small green snakes made into a decoction, taken twice daily, in the treatment of skin eruptions, blotchy skin, etc. Not seen.

(72) *Snakes' Skin*. Dragon's skin. Shay pe.

Skins shed by snakes. Thoroughly boiled and taken in gonorrhœa. Imported in considerable quantities.

(73) *Sparrow's Dung*. Peh ting heang. White cloves.

Not supposed to be effective unless found standing in upright position on the ground. The decoction is taken to purify the blood and to hasten the suppuration of boils. A poultice made with pepper and wine is applied to sores and wounds. Not seen.

(74) *Spiders*. Che choo.

Eaten whole or beaten up in water, taken three times daily to relieve flatulency. Not seen.

(75) *Tiger's Bone*. Wine. Tsaou Hoo Kuh.

Tiger's bones macerated in wine. Used as a strengthening tonic. In quart bottles packed in tin containers. Imported.

(76) *Tiger's Bones*. Hoo kuh.

The bones of the tiger, *Leopardus brachyurus*. Reduced to a powder

mixed with hartshorn and plastron of tortoise, forming a tonic jelly used in rheumatism and diseases of the bones and joints, in ague and in general debility. A strengthening remedy in great repute among the Chinese. Never given to women as it is supposed to cause difficulty in childbirth. Bones of various animals imported in considerable quantity.

(77) *Toads*. Lae twan.

The toads are dried and made into a decoction which is taken internally in the treatment of elephantiasis and leprosy. Applied as an ointment or plaster to sores, ulcers, etc. The toads are also boiled alive in spirits, the liquor thus prepared being more active than the decoction made from the dried toads. Not seen.

(78) *Toad Cakes*. Chen soo.

The living toad is placed in a jar and poked with a stick; the enraged animal secretes a slimy substance which is wiped off, mixed with flour, made into cakes and dried. Also appears in powdered form. Another preparation is made by scraping the mucus from the warts of the living toad, mixing with flour, etc., as above. Taken as snuff. Very efficacious to restore in fainting and in fits. Not recognized.

(79) *Tortoise Shell*. Kwei pan.

The carapace and plastron of several species of tortoise and turtle are used medicinally. The shells are sometimes partially roasted. Imported in considerable quantity.

(80) *Turtle's Head*. Kea yu tow.

The heads of the common fresh-water turtles are dried and powdered and applied to sores and ulcers. Not recognized in powders. Heads not seen thus far.

(81) *Dried Human Urine*. Jin chung peh.

This is the "fur" (a nasty mixture of urine, mould, bacteria, etc.), which collects in urinals after a time, when not cleaned. Decocted with ginseng and other vegetable substances. Boys' urine, not girls, is used. Said to neutralize the stimulating effects of ginseng and other strengthening medicines, possesses demulcent properties, used in lung troubles, to cure debility, as an eye lotion. Eggs boiled in boys' urine are considered very strengthening, eaten by the old and decrepit of both sexes. A favorite medicine. Not recognized thus far.

(82) *Horned Viper*.

The entire snake, with entrails removed, dried on a bamboo frame. Use not determined. Imported in considerable numbers.

(83) *Wasps' Nests*. Foo fung kho.

Made into a decoction and given in consumption. Imported in considerable quantity.

(83) *Wasps' Nests*. Fung fang.

Used medicinally, just how is not clear. Imported in considerable quantity.

(84) *Earth Worms*. Earth dragon. Kheuh shan.

Made into a decoction and taken in cases of gonorrhœa.

Perhaps not imported, unless in powdered form, mixed with other things. Not recognized.

III. CHINESE NAMES OF THE ARTICLES MENTIONED, WITH NUMBER CROSS REFERENCE TO ENGLISH NAMES AND DESCRIPTIONS.

Chan su—Prepared frogs.....	41	Mow le pho—Oyster shells.....	68
Che choo—Spiders.....	74	Muh tsee tsaou—Scouring rush.....	63
Chen kho—Cicada shells.....	18	New kak sae—Cow's horns.....	22
Chen soo—Toad cakes.....	78	New hwang—Cow bezoar.....	7
Chen tuy—Insect skins.....	49	New keaou—Cow's glue.....	21
Chuen hu—Scorpions.....	62	New kin—Cow's sinews.....	23
Chuen shan kea—Manis scales.....	55	New pe keaou—Cow's glue.....	21
Chuy shih—Red hematite.....	47	Num shea pe—Boa skins.....	11
Foo fug kho—Wasps' nest.....	83	O keaou—Ass's glue.....	4
Foo shea pe—Boa skins.....	11	Pan maou—Chinese blistering beetle..	56
Fung hwang—Egg skins.....	32	Peh ting heang—Sparrow's dung....	73
Gu kak—Buffalo horns.....	12	Peh yu chih—White shark's fins.....	66
Hae ma—Sea horse.....	64	Peih hoo—Lizards.....	51
Hae san—Biche de mer.....	10	Sai kok—Rhinoceros horns.....	60
Han lo kho—Snail shells.....	68	Sai pe—Elephant's hide.....	34
Heang tsan—Silk-worm pupa.....	70	Sai pe—Rhinoceros hide.....	59
Heh yu chih—Black shark's fins.....	65	Sang peaou shaou—Cocoons.....	19
Ho le kho—Clam shells.....	68	San soo—Prepared frogs.....	41
Hoo kuh—Tiger's bones.....	76	Se keo—Rhinoceros horns.....	60
lin chung hwang—prepared human ex- crement.....	36	Seang pe—Elephant's hide.....	34
Jin chung peh—dried human urine....	81	Seang ya seao—Ivory shavings.....	50
Jin hwang—human excrement.....	35	Seih kuh—Crickets.....	24
Keaou—Ass's glue.....	4	Se keo peen—Rhinoceros-horn shav- ings.....	61
Kea yu tow—Turtles' heads.....	80	Se pe—Rhinoceros hide.....	59
Ke chun pe—Gizzard lining.....	45	Shan kea—Alligator's skin.....	2
Keub shen—Earth worms.....	30	Shan keah me—Alligator's scales....	1
Keung hou—Burnt ginger.....	44	Shay pe—Snakes' skins.....	72
Kew tsae taze—Leek or garlic seeds....	53	Shen yu heue—Eels' blood.....	31
Kheuh shen—Earth worms.....	84	Shwuy chih—Dried leeches.....	52
Koo tung tseen—Old coins.....	20	Tan lang—Beetles.....	9
Kuh ya—Rice sprouts.....	6	Tang lang—Carion beetles.....	13
Kwei han—Tortoise shells.....	79	Tang lang—Dragon fly.....	14
Lae twan—toads.....	77	Tin gi—Dried frogs.....	42
Lean tow tseen—Rats' dung.....	58	Tsan chung—Dried silkworms.....	69
Ling yang—Chamois horns.....	17	Tsan taz—Eggs of silkworm.....	33
King yang peen—.....	17	Tsaou hoo huh—Tiger's bone wine..	75
Luh keaou—Ass's glue.....	4	Taing seaou shay—Green snakes.....	71
Luh keo peen—Deer horn shavings....	26	Taze wei pe—Hedgehog skin.....	46
Luh kin—Deer sinews.....	27	Tung chung hae tsau—parasitized in- sect larvæ.....	48
Lung kuh—Dragons' (fossil) bones....	28	Wa lang tsze—Shells, cockle.....	68
Lung ya—Dragons' (fossil) teeth.....	29	Woo tseh kuh—Cuttlefish bones.....	25
Mei ya—Barley sprouts.....	5		

Wang yue sha—Rabbits' dung.....	57	Yang chang—Sheep's entrails.....	67
Woo kuh chung—Maggots.....	54	Yu keaou—Fish glue.....	37
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VOLUMETRIC CALCULATIONS OF THE U. S. P.

BY FRANK X. MOERK.

In a paper presented at the 1908 meeting, a classification of official quantitative determinations was given and attention called to the varied methods of procedure; this was followed in 1909 by a second paper containing a classification in which those substances were grouped together for which like processes could be formulated. The present paper takes up the calculations in official volumetric processes and shows that here again varied methods are given which, however, can readily be systematized. The processes may be grouped as Direct and as Residual or Indirect Titrations. In Direct Titrations one volumetric solution is used either with or without accessory reagents, the latter acting upon the substance to be determined but having no action upon the volumetric solution, as in use of glycerin in H_3BO_3 determination, KI in Ferric salts, NaCl in H_3PO_4 , etc.

In Residual Titrations there may be used :

(1) a V. S. in excess acting upon the substance to be determined and the excess determined by means of a second V. S., or,

(2) a reagent not employed as the V. S. which acts upon the substance to be determined, liberating quantitatively a product which is then determined by means of a V. S., as in the use of Na_2SO_3 in the estimation of aldehydes. A Blank Test is essential in residual titration and should be made under identical conditions (but omitting the substance to be determined) so as to establish the relation between the two V. S. or the reagent and the V. S.; the difference between the two titrations gives the Cc. V. S. corresponding to the substance to be determined. In the case of alkaloidal assays the alkaline V. S. should be standardized using the indicator designated in the assay process.

Generally the Blank Test will require the greater volume of the V. S., but the reverse is sometimes true as in aldehydic determinations.

When two V. S. are used the calculation can be based upon either, giving in one case the Cc. V. S. which actually reacts with the substance to be determined, in the other case giving the Cc. V. S. which is equivalent to the substance to be determined: in using standard V. S. it makes no difference if we figure to the same strength solutions (as is done in the alkaloidal assays and in Reduced Iron) but in using empirical V. S. it is always simpler to calculate from the last V. S. which is used (as in case of alkaloidal assays upon the alkaline V. S., in Phenol and Iodine figures

$\text{Na}_2\text{S}_2\text{O}_8$, V. S., Goulard's solution upon $\text{K}_2\text{Mn}_2\text{O}_8$, V. S., saponification-figures upon HCl V. S., etc.

To save space and avoid unnecessary repetitions the following letters are used :

A = Cc. V. S. in a Direct Titration, or Cc. gas evolved in a gasometric determination.

B = Cc. V. S. in a Blank Test.

C = Cc. of last V. S. in a Residual Titration.

W = Weight taken (or Cc. taken in case of Alkaloidal Fluidextracts and Tinctures, H_2O_2 , $\text{Ca}(\text{OH})_2$, Lemon Juice, Tincture of Iodine).

A complete mathematical statement is given to show how certain factors used in the U. S. P. are obtained ; this is followed by a statement in which the factor is used and lastly, if a discrepancy exists between the calculated and the U. S. P. factor or percentage, the latter is given in parenthesis.

I. FACTORS GIVEN FOR CALCULATIONS :

A. Yielding weight found

$$\text{NH}_3 \text{ Spirit} \quad \frac{2 \times 16.93 \times 0.0243375 \times A \times 100}{97.35 (W \ 2 \text{ Cc.})} \text{ or } \frac{0.008465 \times A \times 100}{(W \ 2 \text{ Cc.})}$$

$$\text{Benzaldehyde and Oil B. Almond} \quad \frac{105.25 \times 0.01809 \times (C-B) \times 100}{36.18 (W \ 12 \text{ drops})} \text{ or } \frac{0.052625 \times (C-B) \times 100}{(W \ 12 \text{ drops})} \quad (0.0526)$$

$$\text{Cinnaldehyde} \quad \frac{131.07 \times 0.01809 \times (C-B) \times 100}{2 \times 36.18 (W \ 12 \text{ drops})} \text{ or } \frac{0.03277 \times (C-B) \times 100}{(W \ 12 \text{ drops})} \quad (0.033)$$

$$\text{Citral (Oil Lemon)} \quad \frac{150.98 \times 0.01809 \times (C-B) \times 100}{2 \times 36.18 (W \ 15 \text{ Cc.})} \text{ or } \frac{0.037745 \times 100}{(W \ 15 \text{ Cc.})} \quad (0.03802)$$

B. Yielding percentage found

$$\text{H}\bar{\text{A}} \text{ Glacial} \quad \frac{59.58 \times 0.05574 \times A \times 100}{55.74 (W \ 3 \text{ Cc.})} \text{ or } \frac{5.958 \times A}{(W \ 3 \text{ Cc.})}$$

$$\text{HC} \quad \frac{36.18 \times 0.05574 \times A \times 100}{55.74 (W \ 3 \text{ Cc.})} \text{ or } \frac{3.618 \times A}{(W \ 3 \text{ Cc.})}$$

$$\text{HNO}_3 \quad \frac{62.57 \times 0.05574 \times A \times 100}{55.74 (W \ 3 \text{ Cc.})} \text{ or } \frac{6.257 \times A}{(W \ 3 \text{ Cc.})}$$

$$\text{H}_2\text{SO}_4 \quad \frac{97.35 \times 0.05574 \times A \times 100}{2 \times 55.74 (W \ 3 \text{ Cc.})} \text{ or } \frac{4.8675 \times A}{(W \ 3 \text{ Cc.})}$$

$$\text{NH}_3 \text{ Water} \quad \left\{ \begin{array}{l} \frac{2 \times 16.93 \times 0.048675 \times A \times 100}{97.35} \text{ or } \frac{1.693 \times A}{(W \ 3 \text{ Cc.})} \end{array} \right.$$

$$\text{KOH} \quad \frac{2 \times 55.74 \times 0.048675 \times A \times 100}{97.35 (W \ 1 \text{ Gm.})} \text{ or } \frac{5.574 \times A}{(W \ 1 \text{ Gm.})}$$

$$\text{NaOH} \quad \frac{2 \times 39.76 \times 0.048675 \times A \times 100}{97.35 (W \ 1 \text{ Gm.})} \text{ or } \frac{3.976 \times A}{(W \ 1 \text{ Gm.})}$$

$$\text{I} \quad \frac{125.9 \times 0.024646 \times A \times 100}{246.46 (W \ 0.5 \text{ Gm.})} \text{ or } \frac{1.259 \times A}{(W \ 0.5 \text{ Gm.})}$$



$$\frac{0.000089876 \times 29.81 \times 116.24 \times 273 \times \text{Bar. pres. (760)} \times A \times 100 \text{ Cc. made} \times 100}{2 \times 29.81 \times (273 + 25^\circ) \times 760 \times 100 \text{ Cc. used} \times (W \text{ 3 Cc.})}$$

or $\frac{4.7854 \times A}{(W \text{ 3 Cc.})} \quad (4.8)$



$$\frac{0.000089876 \times 29.81 \times 74.51 \times 273 \times \text{Bar. Pres. (760)} \times A \times 100 \text{ Cc. made} \times 100}{2 \times 29.81 \times (273 + 25^\circ) \times 760 \times 10 \text{ Cc. used} \times (W \text{ 3 Cc.})}$$

or $\frac{0.30674 \times A}{(W \text{ 30 Cc.} + 10)} \quad (0.307)$

$$\text{Cl in CaOCl}_2 \quad \frac{35.18 \times 0.024646 \times A \times 100}{246.46 \times (W \text{ 3-4 Gm.} + 10)} \text{ or } \frac{0.3518 \times A}{(W \text{ 3-4 Gm.} + 10)}$$

$$\text{SO}_2 \text{ in H}_2\text{SO}_5 \quad \frac{63.59 \times 0.024646 \times (B-C) \times 100}{2 \times 246.46 \times (W \text{ 2 Cc.})} \text{ or } \frac{0.31795 \times (B-C)}{(W \text{ 2 Cc.})} \quad (0.318)$$

$$\text{HCOH} \quad \frac{2 \times 29.79 \times 0.048675 \times (B-C) \times 100}{97.35 \times (W \text{ 3 Cc.})} \text{ or } \frac{2.979 \times (B-C)}{(W \text{ 3 Cc.})}$$

$$\text{C}_{10}\text{H}_{18}\text{C}_7\text{H}_5\text{O}_2 \quad \frac{2 \times 196.68 \times 0.0243375 \times (B-C) \times 100}{97.35 \times (W \text{ 10 Cc.})} \text{ or } \frac{9.834 \times (B-C)}{(W \text{ 10 Cc.})}$$

(in Oil Peppermint)

$$\text{C}_{10}\text{H}_{18}\text{C}_7\text{H}_5\text{O}_2 \quad \frac{2 \times 194.68 \times 0.0243375 \times (B-C) \times 100}{97.35 \times (W \text{ 10 Cc.})} \text{ or } \frac{9.734 \times (B-C)}{(W \text{ 10 Cc.})}$$

(in Oil Rosemary)

$$\text{Iodine figures} \quad \frac{125.9 \times 0.024646 \times (B-C) \times 100}{246.46 \times (W \text{ 0.15-0.3 Gm.})} \text{ or } \frac{1.259 \times (B-C)}{(W \text{ 0.15-0.3 Gm.})}$$

(in Oils and Fats)

Alkaloidal Assays.

$$\text{Aconite} \quad \frac{2 \times 640.55 \times 0.0048675}{97.35} =$$

$$0.064055 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.064)$$

$$\text{Mydriatic} \quad \frac{2 \times 287.04 \times 0.0048675}{97.35} =$$

$$\text{Drugs} \quad 0.028704 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.0287)$$

$$\text{Coca} \quad \frac{2 \times 300.92 \times 0.0048675}{97.35} =$$

$$0.030092 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.03)$$

$$\text{Nux} \quad \frac{2 \times 331.73 \times 0.0048675}{97.35} =$$

$$\text{Vomica} \quad 0.033173 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.0332)$$

$$\text{Ipecac} \quad \frac{(231.43 + 245.34) \times 0.0048675}{97.35} =$$

$$0.0238385 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.0238)$$

$$\text{Physo-} \quad \frac{2 \times 273.2 \times 0.0048675}{97.35} =$$

$$\text{stigma} \quad 0.02732 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.0273)$$

$$\begin{aligned} \text{Pilo-} & \frac{2 \times 206.63 \times 0.0048675}{\text{carpus } 97.35} = \\ & 0.020663 \times \left(\text{Cc. N/10 H}_2\text{SO}_4 - \frac{\text{Cc. N/50 KOH}}{5} \right) \times \frac{100}{W} \quad (0.02) \end{aligned}$$

These calculations may be made as follows using as illustration

$$\text{Aconite } \frac{640.55 \times \text{KOH in 1 Cc. V. S.} \times (B-C) \times 100}{55.74 W}$$

Total Alcohols in Essential Oils. (W = weight of Acetylated Oil taken)

Menthol in Oil of Peppermint.

$$\begin{aligned} & \frac{2 \times 196.68 \times 154.98 \times 0.00243375 \times (B-C) \times 100}{97.35 \times 196.98} \quad W - \left[\frac{2 \times (196.68 - 154.98) \times 0.0243375 \times (B-C)}{97.35} \right] \\ \text{or} & \frac{2 \times 154.98 \times 0.0243375 \times (B-C) \times 100}{97.35} \times W - [0.02085 \times (B-C)] \\ \text{or} & \frac{7.749 \times (B-C)}{W - [0.02085 \times (B-C)]} \quad (0.021) \end{aligned}$$

Borneol in Oil of Rosemary.

$$\begin{aligned} & \frac{2 \times 152.98 \times 0.0243375 \times (B-C) \times 100}{97.35} \times W - [0.02085 \times (B-C)] \\ \text{or} & \frac{7.649 \times (B-C)}{W - [0.02085 \times (B-C)]} \end{aligned}$$

Santalol in Oil of Santal.

$$\begin{aligned} & \frac{2 \times 220.53 \times 0.0243375 \times (B-C) \times 100}{97.35} \times W - [0.02085 \times (B-C)] \\ \text{or} & \frac{11.0265 \times (B-C)}{W - [0.02085 \times (B-C)]} \quad (11.026) \end{aligned}$$

C. Factors giving parts of Reagent per 1000 parts of Substance (or Mgm. KOH per 1 Gm. substance).

1. Acid figures in Guaiac, Mastic, Rosin.

$$\frac{0.02787 \times A \times 1000}{W(1 \text{ Gm.})} \quad \text{or} \quad \frac{27.87 \times A}{W(1 \text{ Gm.})}$$

2. Saponification figures in Wax, Fixed Oils and Oil of Rose.

$$\frac{55.74 \times 0.01809 \times (B-C) \times 1000}{36.18} \quad \text{or} \quad \frac{27.87 \times (B-C)}{W(1.5-2 \text{ Gm.})}$$

II. Every Cc. V. S. required is equal to a definite per cent. purity; depend upon the weight taken for titration being simply related to the molecular weight of the substance desired in the assay; several methods, it will be seen, are used to obtain this weight.

A. 1 Cc. V. S. = 5%.

$$\begin{aligned} \text{H}_2\text{PO}_4 & \frac{97.29 \times 0.05574 \times 17 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{2 \times 55.74 \quad 9.73 \text{ Cc. used} \times 10 \text{ Gms.}} = 84.991\% \quad (85) \\ (\text{KSbOC}_4\text{H}_4\text{O}_6)_2\text{H}_2\text{O} & \frac{659.8 \times 0.07259 \times 19.9 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{4 \times 125.9 \quad 33 (32.99) \text{ Cc. used} \times 1 \text{ Gm.}} = 99.47\% \quad (99.5) \end{aligned}$$

MgO and MgCO₃ U. S. P. (after ignition)

$$\frac{40.06 \times 0.05574 \times (25 \text{ Cc.} - 5.8 \text{ Cc.}) \times 100}{2 \times 55.74 \quad 0.4 \text{ Gm.}} = 96.144\% \quad (96)$$

B. 1 Cc. V. S. = 4.04%.

$$\text{ZnO} \quad \frac{80.78 \times 0.05574 \times (30 \text{ Cc.} - 5.5 \text{ Cc.}) \times 100}{2 \times 55.74 \quad 1 \text{ Gm. (after ignition)}} = 98.955\% \quad (99)$$

C. 1 Cc. V. S. = 4%.

$$\text{H}_2\text{C}_2\text{H}_3\text{O}_7\text{H}_2\text{O} \quad \frac{208.5 \times 0.05574 \times 24.87 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{3 \times 55.74 \quad 34.75 \text{ Cc. used} \times 5 \text{ Gm.}} = 99.48\% \quad (99.5)$$

$$\text{CrO}_3 \quad \frac{99.34 \times 0.024646 \times 22.5 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{3 \times 246.46 \quad 8.3 (8.28) \text{ Cc. used} \times 1 \text{ Gm.}} = 89.77\% \quad (89.98)$$

$$\text{C}_4\text{H}_5\text{OH} \quad \frac{93.34 \times 0.024646 \times (30 \text{ Cc.} - 6 \text{ Cc.}) \times 1000 \text{ Cc. made} \times 100}{6 \times 246.46 \quad 25 \text{ Cc. used} \times 1.556 \text{ Gm.}} = 95.979\% \quad (96)$$

D. 1 Cc. V. S. = 2%.

$$\text{HC}_2\text{H}_3\text{O}_3 \quad \frac{89.37 \times 0.05574 \times 37.5 \text{ Cc.} \times 50 \text{ Cc. made} \times 100}{55.74 \quad 44.7 \text{ Cc. used} \times 5 \text{ Gm.}} = 74.975\% \quad (75)$$

$$\text{H}_2\text{C}_4\text{H}_6\text{O}_6 \quad \frac{148.92 \times 0.05574 \times 49.8 \text{ Cc.} \times 100}{2 \times 55.74 \quad 3.73 (3.723) \text{ Gm.}} = 99.41\% \quad (99.6)$$

$$\text{KCN} \quad \frac{2 \times 64.7 \times 0.016869 \times 47.5 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{168.69 \quad 64.7 \text{ Cc. used} \times 1 \text{ Gm.}} = 95\% \quad (95)$$

$$\text{FeSO}_4\text{H}_2\text{O} \quad \frac{10 \times 276.01 \times 0.0031396 \times 49.75 \text{ Cc.} \times 100}{313.96 \quad 1.38 \text{ Gm.}} = 99.503\% \quad (99.5)$$

E. 1 Cc. V. S. = 1%.

$$\text{HC}_2\text{H}_3\text{O}_2 \quad \frac{59.58 \times 0.05574 \times 36 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{55.74 \quad 59.6 \text{ Cc. used} \times 10 \text{ Gm.}} = 35.99\% \quad (36)$$

$$\text{HCl, Dilute} \quad \frac{36.18 \times 0.05574 \times 10 \text{ Cc.} \times 100}{55.74 \quad 3.62 \text{ Gm.}} = 9.994\% \quad (10)$$

$$\text{H}_3\text{PO}_4 \quad \frac{65.53 \times 0.05574 \times 30 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{55.74 \quad 65.5 \text{ Cc. used} \times 10 \text{ Gm.}} = 30.014\% \quad (30)$$

$$\text{H}_3\text{PO}_4, \text{ Dilute} \quad \frac{65.53 \times 0.05574 \times 10 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{55.74 \quad 65.5 \text{ Cc. used} \times 10 \text{ Gm.}} = 10.005\% \quad (10)$$

$$\text{HNO}_3, \text{ Dilute} \quad \frac{62.57 \times 0.05574 \times 10 \text{ Cc.} \times 100}{55.74 \quad 6.26 (6.257) \text{ Gm.}} = 9.995\% (10\%) \quad (10)$$

$$\text{H}_2\text{PO}_4, \text{ Dilute} \quad \frac{97.29 \times 0.05574 \times 10 \text{ Cc.} \times 100}{2 \times 55.74 \quad 4.87 \text{ Gm.}} = 9.989\% \quad (10)$$

$$\text{H}_2\text{SO}_4, \text{ Dilute} \quad \frac{97.35 \times 0.05574 \times 10 \text{ Cc.} \times 100}{2 \times 55.74 \quad 4.868 \text{ Gm.}} = 9.999\% \quad (10)$$

$$\text{H}_2\text{SO}_4, \text{ Aromatic} \quad \frac{97.35 \times 0.048675 \times (25 \text{ Cc.} - 5 \text{ Cc.}) \times 100 \text{ Cc. made} \times 100}{97.35 \quad 48.68 \text{ Cc. used} \times 10 \text{ Gm.}} = 19.998\% \quad (20)$$

$$\text{HBr, Dilute} \quad \frac{80.36 \times 0.016869 \times 10 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{168.69 \quad 8.04 \text{ Cc. used} \times 10 \text{ Gm. (neutr. with NH}_3\text{)}} = 9.995\% \quad (10)$$

$$\text{FeI, Syrup} \quad \frac{307.3 \times 0.009653 \times (6 \text{ Cc.} - 1 \text{ Cc.}) \times 100 \text{ Cc. made} \times 100}{2 \times 96.53 \quad 15.4 (15.36) \text{ Cc. used} \times 10 \text{ Gm.}} = 4.988\% \quad (5)$$

$$\text{FeCO}_3, \text{ Sacch.} \quad \frac{6 \times 115.05 \times 0.0048713 \times 15 \text{ Cc.} \times 100}{292.28 \quad 1.15 \text{ Gm.}} = 15\%$$

$$\text{Fe}_2\text{Cl}_6 \quad \frac{55.5 \times 0.024646 \times 22 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{246.46 \quad 55.5 \text{ Cc. used} \times 1 \text{ Gm.}} = 22 \%$$

Fe₂ Quin. Citr.Fe₂ Quin. Citr. Soluble }

$$\frac{55.5 \times 0.024646 \times 13.5 \text{ Cc.} \times 50 \text{ Cc. made (after rem. alk.)} \times 100}{246.46 \quad 25 \text{ Cc. used} \quad 0.555 \text{ Gm.}} = 13.5 \%$$

Fe₂C₂

$$\text{Fe}_2(\text{NH}_4)\text{C} \quad \frac{55.5 \times 0.024646 \times 16 \text{ Cc.} \times 100}{246.46 \quad 0.555 \text{ Gm.}} = 16 \%$$

$$\text{Fe}_2(\text{NH}_4)_2(\text{SO}_4)_4 \cdot 24\text{H}_2\text{O} \quad \frac{55.5 \times 0.024646 \times 11.5 \text{ Cc.} \times 100}{246.46 \quad 0.555 \text{ Gm.}} = 11.5 \%$$

$$\text{Fe}_2(\text{NH}_4)_2(\text{SO}_4)_4 \cdot 24\text{H}_2\text{O} \quad \frac{957.38 \times 0.024646 \times 11.5 \text{ Cc.} \times 100}{2 \times 246.46 \quad 0.555 \text{ Gm.}} = 99.18 \%. \quad (99.5)$$

$$\text{Fe}_2(\text{NH}_4)\text{T} \quad \frac{55.5 \times 0.024646 \times 13 \text{ Cc.} \times 100}{246.46 \quad 0.555 \text{ Gm.}} = 13 \%$$

$$\text{Fe}_2\text{KT} \quad \frac{55.5 \times 0.024646 \times 15 \text{ Cc.} \times 100}{246.46 \quad 0.555 \text{ Gm.}} = 15 \%$$

$$\text{Fe}_2(\text{PO}_4)_2 \text{ Soluble} \quad \frac{55.5 \times 0.024646 \times 12 \text{ Cc.} \times 100}{246.46 \quad 0.555 \text{ Gm.}} = 12 \%$$

$$(\text{Fe}_2)_2(\text{P}_2\text{O}_7)_2 \text{ Soluble} \quad \frac{55.5 \times 0.024646 \times 10 \text{ Cc.} \times 100}{246.46 \quad 0.555 \text{ Gm.}} = 10 \%$$

Pb₂O₂ Solution

$$\frac{5 \times 543.74 \times 0.0031396}{2 \times 313.96} \times 35 \text{ Cc.} - \left(2 \text{ Cc.} \times \frac{50 \text{ Cc. made}}{10 \text{ Cc. used}} \right) \times \frac{100 \text{ Cc. made} \times 100}{13.6 (13.594) \text{ Cc. used} \times 10 \text{ Gm.}} = 24.988 \%. \quad (24.999)$$

Ferrum Reductum. 10.02518 = I in 1 Cc. N/5 V. S. or 0.049246 = Na₂S₂O₅H₂O
in 1 Cc. N/5 V. S. 1 Cc. N/5 V. S. = 1 % Fe if 0.555 Gm. be taken.

$$\frac{55.5 \times 0.02518 \times 100}{2 \times 125.9 \quad 0.555 \text{ Gm.}} \times \frac{\text{wt I taken}}{0.02518} - \left(\frac{A \times 0.024646}{0.049292} \times \frac{100 \text{ Cc. made}}{25 \text{ Cc. used}} \right) = \% \text{ Fe}$$

or U. S. P.

$$\frac{\text{wt I taken (2.6 Gm.?)}}{0.02518} - 2 A = \% \text{ Fe.}$$

F. 1 Cc. V. S. = 0.5 %.

$$\text{Fe}_2\text{Cl}_6 \text{ Solution} \quad \frac{55.5 \times 0.024646 \times 20 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{246.46 \quad 11.1 \text{ Cc. used} \times 10 \text{ Gm.}} = 10 \%$$

$$(\text{Fe}_2)_2\text{O}(\text{SO}_4)_4 \text{ Solution} \quad \frac{55.5 \times 0.024646 \times 27.2 (27.15) \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{246.46 \quad 11.1 \text{ Cc. used} \times 10 \text{ Gm.}} = 13.6 \%. \quad (13.575)$$

$$\text{Fe}_2(\text{SO}_4)_3 \text{ Solution} \quad \frac{55.5 \times 0.024646 \times 20 \text{ Cc.} \times 100}{246.46 \quad 1.11 \text{ Gm.}} = 10 \%$$

$$\text{Fe}_2 \text{ Strych. Citr.} \quad \frac{55.5 \times 0.024646 \times 32 \text{ Cc.} \times 100 \text{ Cc. made (after rem. alk.)} \times 100}{246.46 \quad 25 \text{ Cc. used} \quad 4.44 \text{ Gm.}} = 16 \%$$

$$\text{K}_2\text{C}_4\text{H}_8\text{O}_7 \text{ Solution} \quad \frac{2 \times 304.2 \times 0.0243375 \times 16 \text{ Cc.} \times 100}{3 \times 97.35 \quad 10.14 \text{ Gm. (ignited, after weighing)}} = 8 \%$$

$$\text{HI Dilute} \quad \frac{126.9 \times 0.009653 \times (25 \text{ Cc.} - 5 \text{ Cc.}) \times 100}{96.53 \quad 2.54 \text{ Gm.}} = 10 \%$$

G. 1 Cc. V. S. = 0.25 %.

$$\text{HC}_2\text{H}_3\text{O}_2 \text{ Dilute } \frac{59.58 \times 0.05574 \times 24 \text{ Cc.} \times 100}{55.74 \times 23.8 \text{ Gm.}} = 6.008 \% \quad (6)$$

$$\text{Fe}_3\text{Cl}_6 \text{ Tincture } \frac{55.5 \times 0.024646 \times 18.3 \text{ Cc.} \times 100}{246.46 \times 2.22 \text{ Gm.}} = 4.575 \% \quad (4.58)$$

$$\text{or } \frac{322.08 \times 0.024646 \times 18.3 \times 100}{2 \times 246.46 \times 2.22 \text{ Gm.}} = 13.275 \%$$

H. 1 Cc. = 0.2 %

$$\text{HCN Dilute } \frac{2 \times 26.84 \times 0.016869 \times 10 \text{ Cc.} \times 50 \text{ Cc. made} \times 100}{168.69 \times 26.9 (26.84) \text{ Cc. used} \times 5 \text{ Gm.}} = 1.995 \% \quad (2)$$

$$\text{HI Syrup } \frac{126.9 \times 0.009653 \times (8 \text{ Cc.} - 3 \text{ Cc.}) \times 50 \text{ Cc. made} \times 100}{96.53 \times 10 \text{ Cc. used} \times 31.73 (31.725) \text{ Gm.}} = 0.999 \% \quad (1 \%)$$

$$\text{I Solution Comp. } \frac{125.9 \times 0.024646 \times 24.75 \text{ Cc.} \times 100}{246.46 \times 6.3 \text{ Gm.}} = 4.947 \% \quad (5)$$

$$\text{KOH Solution } \frac{2 \times 55.74 \times 0.048675 \times 25 \text{ Cc.} \times 100}{97.35 \times 28 (27.87) \text{ Gm.}} = 4.97 \% \quad (5)$$

$$\text{NaOH Solution } \frac{2 \times 39.76 \times 0.048675 \times 25 \text{ Cc.} \times 100}{97.35 \times 20 (19.9) \text{ Gm.}} = 4.97 \% \quad (4.995)$$

I. 1 Cc. = 0.1 %

$$\text{H}_2\text{O}_2 \text{ Solution } \frac{5 \times 33.76 \times 0.0031396 \times 30 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{313.96 \times 16.9 \text{ Cc. used} \times 10 \text{ Cc.}} = 2.996 \% \quad (3)$$

K. 1 Cc. = 0.05 %

$$\text{Cl in NaOCl Solution } \frac{35.18 \times 0.024646 \times 48 \text{ Cc.} \times 100}{246.46 \times 7 \text{ Gm.}} = 2.412 \% \quad (2.4)$$

L. 1 Cc. = 0.02 %

$$\left. \begin{array}{l} \text{As}_2\text{O}_3 \text{ in As}_2\text{O}_3 \text{ Solution} \\ \text{As}_2\text{O}_3 \text{ in KAsO}_3 \text{ Solution} \end{array} \right\} \frac{196.44 \times 0.01259 \times 50 \times 100}{4 \times 125.9 \times 24.6 \text{ Gm.}} = 0.998 \% \quad (1 \%)$$

III. RESULTS EXPRESSED IN Cc. V. S.

Calculations for percentage in these cases can be made as in previous illustrations.

$$\text{H}_3\text{BO}_3 \quad \frac{61.54 \times 0.03976 \times 16.2 \text{ Cc.} \times 100}{39.76 \times 1 \text{ Gm.}} = 99.695 \% \quad (99.8 \%)$$

$$\text{HC}_2\text{Cl}_3\text{O}_2 \quad \frac{162.12 \times 0.03976 \times 6.1 \text{ Cc.} \times 100}{39.76 \times 1 \text{ Gm.}} = 98.89 \% \quad (98.9 \%)$$

$$\text{H}_3\text{C}_6\text{H}_5\text{O}_7\text{H}_2\text{O} \quad \frac{208.5 \times 0.05574 \times 10 \text{ Cc.} \times 100}{3 \times 55.74 \times 10 \text{ Cc.}} = 6.86 \text{ w/v} \quad (7-9 \%)$$

$$\text{Ca(OH)}_2 \quad \frac{73.56 \times 0.0048675 \times 19 \text{ Cc.} \times 100}{97.35 \times 50 \text{ Cc.}} = 0.1397 \text{ w/v} \quad (0.14)$$

$$\text{KHCO}_3 \quad \frac{2 \times 99.41 \times 0.0243375 \times 19.9 \text{ Cc.} \times 100}{97.35 \times 1 \text{ Gm.}} = 98.91 \% \quad (99 \%)$$

$$\text{K}_2\text{CO}_3 \quad \frac{137.27 \times 0.048675 \times 14.3 (14.28) \text{ Cc.} \times 100}{97.35 \times 1 \text{ Gm.}} = 99.148 \% \quad (99.01 \%)$$

$$\text{NaHCO}_3 \quad \frac{2 \times 83.43 \times 0.048675 \times 23.7 (23.74) \text{ Cc.} \times 100}{97.35 \times 2 \text{ Gm.}} = 98.86 \% \quad (99.03 \%)$$

$$\text{Na}_2\text{CO}_3\text{H}_2\text{O} \quad \frac{123.19 \times 0.243375 \times 32.3 \text{ Cc.} \times 100}{97.35 \times 1 \text{ Gm.}} = 99.476 \% \quad (99.5 \%)$$

$$\begin{aligned} \text{KBr} \quad & \frac{118.22 \times 0.016869 \times 24.6 \text{ (to 25.85) Cc.} \times 100}{168.69 \quad 0.3 \text{ Gm.}} = 96.94 \text{ to } 101.87 \% \quad (97 \%) \\ \text{KI} \quad & \frac{164.76 \times 0.016869 \times 30 \text{ (to 30.8) Cc.} \times 100}{168.69 \quad 0.5 \text{ Gm.}} = 98.86 \text{ to } 101.49 \% \quad (99 \%) \\ \text{NaBr} \quad & \frac{102.24 \times 0.016869 \times 28.5 \text{ (to 30) Cc.} \times 100}{168.69 \quad 0.3 \text{ Gm.}} = 97.13 \text{ to } 102.24 \% \quad (97 \%) \\ \text{NaI} \quad & \frac{148.78 \times 0.016869 \times 33 \text{ (to 34.6) Cc.} \times 100}{168.69 \quad 0.5 \text{ Gm.}} = 98.19 \text{ to } 102.95 \% \quad (98 \%) \\ \text{SrBr}_2 \cdot 6\text{H}_2\text{O} \quad & \frac{352.94 \times 0.016869 \times 27.4 \text{ (27.48) to 29.4 Cc.} \times 100}{2 \times 168.69 \quad 0.5 \text{ Gm.}} = 96.7 \text{ (96.99) to } 103.76 \% \quad (97 \%) \\ \text{ZnBr}_2 \quad & \frac{223.62 \times 0.016869 \times 26 \text{ (to 26.8) Cc.} \times 100}{2 \times 168.69 \quad 0.3 \text{ Gm.}} = 96.9 \text{ to } 99.88 \% \quad (97 \%) \\ \text{NH}_4\text{I} \quad & \frac{143.83 \times 0.016869 \times 16.9 \text{ Cc.} \times 100}{168.69 \quad 0.25 \text{ Gm.}} = 97.23 \% \quad (97 \%) \\ \text{HCN (in Oil B. Almond)} \quad & \frac{26.84 \times 0.016869 \times 7.5 \text{ (to 14.9) Cc.} \times 100}{168.69 \quad 1 \text{ Gm.}} = 2.013 \text{ to } 3.999 \% \quad (2.4 \%) \\ \text{I (in S}_2\text{I}_2) \quad & \frac{125.9 \times 0.024646 \times 28 \text{ Cc.} \times 100}{246.46 \quad 0.5 \text{ Gm.}} = 70.5 \% \quad (\text{About } 80 \%) \\ \text{I Tincture} \quad & \frac{125.9 \times 0.024646 \times 27.25 \text{ Cc.} \times 100}{246.46 \quad 5 \text{ Cc.}} = 6.86 \text{ w/v} \quad (\text{About } 6.86 \text{ w/v}) \\ \text{AsI}_3 \quad & \frac{452.1 \times 0.01259 \times 21.9 \text{ Cc.} \times 100}{2 \times 246.46 \quad 0.5 \text{ Gm.}} = 99.01 \% \quad (99 \%) \\ \text{As}_2\text{O}_3 \quad & \frac{196.44 \times 0.01259 \times 20.3 \text{ Cc.} \times 100}{4 \times 125.9 \quad 0.1 \text{ Gm.}} = 99.69 \% \quad (99.8 \%) \\ \text{Na}_2\text{S}_2\text{O}_5 \cdot \text{H}_2\text{O} \quad & \frac{246.46 \times 0.01259 \times 39.75 \times 100}{125.9 \quad 1 \text{ Gm.}} = 97.97 \% \quad (98 \%) \\ \text{Organic Salts of K and Na, by ignition are converted into carbonates which after thorough extraction with H}_2\text{O give a solution to be titrated with Acid V. S.} \\ \text{KC}_2\text{H}_3\text{O}_2 \quad & \frac{2 \times 97.44 \times 0.0243375 \times 20.1 \text{ Cc.} \times 100}{97.35 \quad 1 \text{ Gm.}} = 97.93 \% \quad (98 \%) \\ \text{KHC}_4\text{H}_4\text{O}_6 \quad & \frac{2 \times 186.78 \times 0.0243375 \times 10.6 \text{ Cc.} \times 100}{97.35 \quad 1 \text{ Gm.}} = 98.99 \% \quad (99 \%) \\ \text{K}_2\text{C}_8\text{H}_6\text{O}_7 \cdot \text{H}_2\text{O} \quad & \frac{322.08 \times 0.01809 \times 18.4 \text{ Cc.} \times 100}{3 \times 36.18 \quad 1 \text{ Gm.}} = 98.77 \% \quad (99 \%) \\ \text{KNaC}_4\text{H}_4\text{O}_6 \cdot \text{H}_2\text{O} \quad & \frac{280.18 \times 0.01809 \times 14.1 \text{ Cc.} \times 100}{2 \times 36.18 \quad 1 \text{ Gm.}} = 98.76 \% \quad (99 \%) \\ \text{NaC}_7\text{H}_5\text{O}_3 \cdot 3\text{H}_2\text{O} \quad & \frac{2 \times 135.1 \times 0.0243375 \times 14.7 \text{ (14.74) Cc.} \times 100}{97.35 \quad 1 \text{ Gm.}} = 99.3 \text{ (99.57) } \quad (99.5 \%) \\ \text{NaC}_7\text{H}_5\text{O}_2 \quad & \frac{143.01 \times 0.01809 \times 13.85 \text{ Cc.} \times 100}{36.18 \quad 1 \text{ Gm.}} = 99.03 \% \quad (99 \%) \\ 2(\text{Na}_2\text{C}_4\text{H}_5\text{O}_7) \cdot 11\text{H}_2\text{O} \quad & \frac{709.2 \times 0.0243375 \times 16.4 \text{ (16.41) Cc.} \times 100}{3 \times 97.35 \quad 1 \text{ Gm.}} = 96.92 \text{ (96.98) } \quad (97 \%) \end{aligned}$$

$$\text{NaC}_7\text{H}_5\text{O}_2 \quad \frac{2 \times 158.89 \times 0.0243375 \times 12.5 (12.52) \text{ Cc.} \times 100}{97.35 \times 1 \text{ Gm.}} = 99.31 \% (99.46) \quad (99.5)$$

$$\text{NH}_4\text{Br} \quad \frac{97.29 \times 0.016869 \times 31.6 \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{168.69 \times 10 \text{ Cc. used} \times 1 \text{ Gm.}} = 102.48 \% (97 \%)$$

$$\text{NH}_4\text{Cl} \quad \frac{53.11 \times 0.016869 \times 18.7 (18.73) \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{168.69 \times 10 \text{ Cc. used} \times 1 \text{ Gm.}} = 99.32 \% (99.47) \quad (99.5 \%)$$

$$\text{LiBr} \quad \frac{86.34 \times 0.016869 \times 22.5 (23.9) \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{168.69 \times 20 \text{ Cc. used} \times 1 \text{ Gm.}} = 97.13 \text{ to } 103.18 \% (97 \%)$$

$$\text{NaCl} \quad \frac{58.06 \times 0.016869 \times 17 (17.05) \text{ Cc.} \times 100 \text{ Cc. made} \times 100}{168.69 \times 10 \text{ Cc. used} \times 1 \text{ Gm.}} = 98.7 \% (98.99) \quad (99 \%)$$

$$\text{NH}_4\text{HCO}_3\text{NH}_4\text{NH}_2\text{CO}_3 \quad \frac{156.01 \times 0.05574 \times (50 \text{ Cc.} - 12.7 \text{ Cc.}) \times 100}{3 \times 55.74 \times 2 \text{ Gm.}} = 96.986 \% (97 \%)$$

$$\text{Li}_2\text{CO}_3 \quad \frac{73.51 \times 0.05574 \times (20 \text{ Cc.} - 6.6 \text{ Cc.}) \times 100}{2 \times 55.74 \times 0.5 \text{ Gm.}} = 98.5 \% (98.5 \%)$$

$$\text{SrI}_2\cdot 6\text{H}_2\text{O} \quad \frac{446.02 \times 0.009653 \times [25 \text{ Cc.} - (1.7 \text{ to } 3.1 \text{ Cc.})] \times 100}{2 \times 96.53 \times 0.5 \text{ Gm.}} = 103.92 \text{ to } 97.68 \% (98 \%)$$

$$\text{ZnI}_2 \quad \frac{316.7 \times 0.009653 \times [35 \text{ Cc.} - (3.4 \text{ to } 4 \text{ Cc.})] \times 100}{2 \times 96.53 \times 0.5 \text{ Gm.}} = 100.08 \text{ to } 98.18 \% (98 \%)$$

$$\text{AgNO}_3 \text{ (crystals)} \quad \frac{168.69 \times 0.016869 \times (30 \text{ Cc.} - 0.4 \text{ Cc.}) \times 100}{168.69 \times 0.5 \text{ Gm.}} = 99.86 \% (99.9 \%)$$

$$\text{AgNO}_3 \text{ (moulded)} \quad \frac{168.69 \times 0.016869 \times (30 \text{ Cc.} - 1.9 \text{ Cc.}) \times 100}{168.69 \times 0.5 \text{ Gm.}} = 94.8 \% (94.8 \%)$$

$$\text{AgNO}_3 \text{ (mitigated)} \quad \frac{168.69 \times 0.016869 \times (20 \text{ Cc.} - 0.3 \text{ Cc.}) \times 100}{168.69 \times 1 \text{ Gm.}} = 33.23 \% (33.3 \%)$$

$$\text{MnO}_2 \quad \frac{5 \times 86.36 \times 0.0031396 \times (50 \text{ Cc.} - 13 \text{ Cc.}) \times 100}{313.96 \times 0.2 \text{ Gm.}} = 79.99 \% (80 \%)$$

$$\text{K}_2\text{Mn}_2\text{O}_8 \quad \frac{313.96 \times 0.0031396 \times (35 \text{ Cc.} - 3.5 \text{ Cc.}) \times 100}{313.96 \times 0.1 \text{ Gm.}} = 98.9 \% (99 \%)$$

$$\text{NaHSO}_4 \quad \frac{103.35 \times 0.024646 \times (50 \text{ Cc.} - 6.45 \text{ Cc.}) \times 100}{2 \times 246.46 \times 0.25 \text{ Gm.}} = 90.02 \% (90 \%)$$

$$\text{Na}_2\text{SO}_4\cdot 7\text{H}_2\text{O} \quad \frac{250.39 \times 0.024646 \times (50 \text{ Cc.} - 13 \text{ Cc.}) \times 100}{2 \times 246.46 \times 0.5 \text{ Gm.}} = 94.02 \% (94 \%)$$

$$\text{NaNO}_2 \quad \frac{5 \times 68.57 \times 0.0031396 \times (30 \text{ Cc.} - 3.75 \text{ Cc.}) \times 100 \text{ Cc. made} \times 100}{313.96 \times 10 \text{ Cc. used} \times 1 \text{ Gm.}} = 89.99 \% (90 \%)$$

$$\text{C}_8\text{H}_8\text{NCS (in Vol. Oil Mustard)} \quad \frac{98.4 \times 0.009653}{2 \times 96.53} \times \left[30 \text{ Cc.} - \left(\frac{5.6 \text{ Cc.} \times 100 \text{ Cc. made}}{50 \text{ Cc. used}} \right) \right] \times \frac{50 \text{ Cc. made} \times 100}{5 \text{ Cc. used} \times 1 \text{ Gm.}} = 92.496 \% (92 \%)$$

Acid Figures.

$$\text{Balsam Copaiba} \quad \frac{0.02787 \times 2.3 \text{ Cc. to } 3.2 \text{ Cc.} \times 1000}{1 \text{ Gm.}} = 64.1 \text{ to } 89.18.$$

$$\text{Balsam Peru} \quad \frac{0.02787 \times 2 \text{ Cc.} \times 1000}{1 \text{ Gm.}} = 55.74.$$

$$\text{Balsam Tolu} \quad \frac{0.02787 \times 4 \text{ Cc. to } 6 \text{ Cc.} \times 1000}{1 \text{ Gm.}} = 111.48 \text{ to } 167.22.$$

$$\text{Resin Jalap} \quad \frac{0.02787 \times 0.5 \text{ Cc.} \times 1000}{1 \text{ Gm.}} = 13.93.$$

$$\text{Lard} \quad \frac{0.05574 \times 0.2 \text{ Cc.} \times 1000}{10 \text{ Gm.}} = 1.115.$$

$$\text{Wool-fat} \quad \frac{0.05574 \times 0.05 \text{ Cc.} \times 1000}{2 \text{ Gm.}} = 1.393.$$

Saponification figures.

$$\text{Balsam Tolu} \quad \frac{0.02787 \times [20 \text{ Cc.} - (13.2 \text{ Cc. to } 14.5 \text{ Cc.})] \times 1000}{1 \text{ Gm.}} = 189.52 \text{ to } 153.28$$

$$\text{Resin Jalap} \quad \frac{0.02787 \times (25 \text{ Cc.} - 20 \text{ Cc.}) \times 1000}{1 \text{ Gm.}} = 139.35$$

Ester figure.

$$\text{Balsam Peru} \quad \frac{0.02787 \times (25 \text{ Cc.} - 1.32 \text{ Cc.}) \times 1000}{\text{Cinnamoin from } 2.5 \text{ Gms.}} = 131.55$$

Allowable Acidity. These in many cases can be calculated or expressed in percentage of some definite substance of acid reaction.

$$\text{HCOH Solution} \quad \frac{45.67 \times 0.05574 \times 1 \text{ Cc.} \times 100}{55.74 \times 20 \text{ Cc.} \times 1.076} = 0.21 \% \text{ HCHO}_3$$

$$(\text{C}_2\text{H}_5\text{OH})_2 \quad \frac{59.58 \times 0.05574 \times 0.5 \text{ Cc.} \times 100}{55.74 \times 8 \text{ Cc.} \times 0.99} = 0.38 \% \text{ HC}_2\text{H}_3\text{O}_2$$

$$\text{Malt} \quad \frac{89.37 \times 0.005574 \times 3.35 \text{ Cc.} \times 100}{55.74 \times 10 \text{ Gms.}} = 0.3 \% \text{ HC}_2\text{H}_3\text{O}_2$$

$$\left. \begin{array}{l} \text{Wine Red} \\ \text{Wine White} \end{array} \right\} \frac{148.92 \times 0.05574 \times 4 \text{ (to } 5.1) \text{ Cc.} \times 100}{2 \times 55.74 \times 50 \text{ Cc.}} = 0.45 \text{ to } 0.77 \% \text{ H}_2\text{C}_4\text{H}_4\text{O}_4$$

$$\text{Whisky} \quad \frac{59.58 \times 0.05574 \times 1.2 \text{ Cc.} \times 100}{55.74 \times 100 \text{ Cc.}} = 0.071 \% \text{ HC}_2\text{H}_3\text{O}_2$$

$$\text{Brandy} \quad \frac{59.58 \times 0.05574 \times 1 \text{ Cc.} \times 100}{55.74 \times 100 \text{ Cc.}} = 0.06 \% \text{ HC}_2\text{H}_3\text{O}_2$$

Allowable Acidity. In cases not included in the above could be expressed as Acid figures.

$$\text{C}_6\text{H}_{11}\text{NO}_2 \quad \frac{0.05574 \times 0.05 \text{ Cc.} \times 1000}{5 \text{ Cc.} \times 0.87} = 0.64$$

$$\text{Ca}(\text{H}_2\text{PO}_4)_2 \quad \frac{0.005574 \times 1 \text{ Cc.} \times 1000}{1 \text{ Gm.}} = 5.57$$

$$\text{H}_2\text{O}_2 \text{ Solution} \quad \frac{0.005574 \times (5 \text{ Cc.} - 2.5 \text{ Cc.}) \times 1000}{25 \text{ Cc.}} = 0.56$$

Allowable Alkalinity. These in most cases can be calculated or expressed as corresponding carbonates; in a few cases as hydroxides.

$$\begin{array}{lcl}
 \left. \begin{array}{l} \text{KBr} \\ \text{KI} \end{array} \right\} & \frac{137.27 \times 0.0048675 \times 0.1 \text{ Cc.} \times 100}{97.35 \times 1 \text{ Gm.}} & = 0.07 \% \text{ K}_2\text{CO}_3 \\
 \text{K(H}_2\text{PO}_4) & \frac{137.27 \times 0.003618 \times 1.5 \text{ Cc.} \times 100}{2 \times 36.18 \times 1 \text{ Gm.}} & = 1.03 \% \text{ K}_2\text{CO}_3 \\
 \text{Na(H}_2\text{PO}_4) & \frac{105.31 \times 0.003618 \times 1.5 \text{ Cc.} \times 100}{2 \times 36.18 \times 1 \text{ Gm.}} & = 0.79 \% \text{ Na}_2\text{CO}_3 \\
 \left. \begin{array}{l} \text{NaBr} \\ \text{NaI} \end{array} \right\} & \frac{105.31 \times 0.0048675 \times 0.1 \text{ Cc.} \times 100}{97.35 \times 1 \text{ Gm.}} & = 0.053 \% \text{ Na}_2\text{CO}_3 \\
 \text{NaHCO}_3 & \frac{105.31 \times 0.03618 \times 0.2 \text{ Cc.} \times 100}{36.18 \times 1 \text{ Gm.}} & = 2.11 \% \text{ Na}_2\text{CO}_3 \\
 \text{Soap} & \frac{2 \times 39.76 \times 0.006255 \times 3 \text{ Cc.} \times 100}{125.1 \times 5 \text{ Gm.}} & = 0.24 \% \text{ NaOH.} \\
 \text{Soap Soft} & \frac{2 \times 55.74 \times 0.006255 \times 2.3 \text{ (to 4.5) Cc.} \times 100}{125.1 \times 5 \text{ Gm.}} & = 0.26 \text{ to } 0.50 \% \text{ KOH.} \\
 \text{ZnCO}_3 & \frac{105.31 \times 0.003618 \times 1 \text{ Cc.} \times 100}{2 \times 36.18 \times 1 \text{ Gm.}} & = 0.53 \% \text{ Na}_2\text{CO}_3.
 \end{array}$$

The following suggestions are made to bring about uniformity in processes and calculations and to make them more practical so as to correspond better with the methods of the analyst :

(1) That a definite volume of a liquid be taken, either as Cc. or drops, and accurately weighed, as directed now in the assay of strong mineral acids, formaldehyde, benzaldehyde, etc., etc.

(2) That approximate weights of solids be accurately determined as is now the case with KOH, NaOH, etc., etc.

(3) That instead of giving results in Cc. V. S., these be expressed either in per cent. of the substance to be determined or given as acidity, saponification or ester figure.

(4) That where an abbreviated calculation involves a factor the latter be in accordance with (3).

(5) That the common fractions used in the correction for temperature and barometric pressure in gasometric determinations be replaced by decimal fractions.

(6) In those cases where the percentage results are apt to run above 100 as in the case of haloid salts, a statement could be given why this is allowable or else a short method given by which the actual content of the important constituent can be determined as by a differential calculation ; in gravimetric processes the same condition exists in the lithium salts.

By following these suggestions the weight used in a determination can be rapidly obtained, avoiding the danger of concentration by evaporation or diminished weight of active material by absorption of moisture. In looking over the statements for calculations it will be seen that frequently two weights or volumes are given, the first of the two as a rule yields a deficient percentage of purity and to obtain the official percentage the

second figures are necessary ; thus (1) under dilute HNO_3 , 6.26 Gm. (6.257 Gm.) are directed to be taken ; (2) under Goulard's extract 13.6 Cc. (13.594 Cc.) of a dilution are to be taken ; and (3) under sodium salicylate 12.5 Cc. (12.52 Cc.) of the V. S. are stated to be necessary. Whilst only single illustrations are here given, inspection of the statements will reveal many others.

In conclusion the writer wishes to state again that this series of papers upon the quantitative tests was written for the purpose of bringing about greater uniformity, and trusts that the papers will be of assistance to the next revision committee.

MINUTES

OF THE

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

FIRST SESSION—FRIDAY AFTERNOON, MAY 6, 1910.

The first session of the Section on Practical Pharmacy and Dispensing was called to order by Chairman Otto Raubenheimer, of Brooklyn, at 3:30 p. m., and Mr. Raubenheimer asked his Associate on the Committee, Mr. White, to preside while he read his Address as Chairman:

Fellow Members: First of all permit me to thank you for electing me Chairman of the Section on Practical Pharmacy and Dispensing at the Los Angeles Meeting, although I was prevented from being present. I greatly appreciate the honor and as I have devoted a good deal of my time to the interest of this Section as well as the Association in general, I thereby hope I have "made good."

I congratulate the A. Ph. A. on the improved outlook in Pharmacy and quite especially in Practical Pharmacy and Dispensing. It must be remembered that Pharmacy is no longer in its infancy; it has even passed its youth and is now in its full manhood in the U. S. The present age is said to be one of commercialism, and we are accustomed to portray Americans as exclusively occupied with business affairs, having as their mottoes, "Time is money" and "Business is business."

But we stand on the threshold of a new century, a century of science, a century in which science and business can be combined, a century in which practical pharmacy and dispensing can be thoroughly developed and practiced.* Just about a hundred years ago the world gave birth to such eminent chemists as Woehler, Liebig, Graham, Boettger, Laurent, Regnault, Péligot, and Bunsen, to such eminent pharmacists as Mohr, Boullay, Redwood, Pelouze, Otto, Landerer, Wittstein, Monsel and Fehling, and also to such eminent botanists, pharmacognosists, pharmacologists as Wiggers, Basham, Schwann, Darwin, de Vrij, Berg, Mueller, etc. What a collection of immortal names! We will soon celebrate the centennial of the discovery of the most important alkaloids, the centennial of the birth of our U. S. P. and the centennial of the foundation of the oldest college of pharmacy in the U. S. Let us hope that this coming decade will be equally as productive and will be one that will be remembered in the annals of pharmacy.

* Standing as we do, on this historic ground of Virginia, I cannot pass on without mentioning a few historical pharmaceutical data.

During the past few years, Pharmacy, the daughter of Galenus, and Medicine, the daughter of Hippocrates, have been aroused from their sleep and indolence by various causes. The Pure Food and Drugs Act which compelled the manufacturers to tell the truth on the label, the American Medical Association which exposed the Nostrums, the U. S. P. and N. F. propaganda which so successfully sweeps the entire country, and, last but not least, the A. Ph. A. with their grand work and the establishment of the various branches, all have done their share to greatly benefit practical pharmacy and dispensing. Joint meetings are being held all over the U. S. with the intention of getting physicians and pharmacists into closer touch, and with the intention of getting physicians to prescribe official U. S. P. and N. F. preparations instead of proprietaries and nostrums.

At one of these meetings in New York City, quite a novel feature was brought out by Dr. Bastedo of the College of Physicians and Surgeons, namely, the establishment of "certified" pharmacies: Just as the purest milk is distinguished from the ordinary kind by being certified, the doctor recommends to separate the "sheep from the goats" in pharmacy by the establishment of certified pharmacies.

In my opinion this is an excellent idea and ought to be further followed up. In France practically, the same condition exists by having pharmacists of the first and second class. A member of the A. Ph. A., especially one who attends the meetings, contributes papers and takes part in the discussions, can in my opinion be justly called a "certified" pharmacist. I would therefore advise the better class of druggists and pharmacists to join the A. Ph. A. and display their certificates of membership as being the equal of a diploma of "certified" pharmacist. The time will surely come when there will be two classes of pharmacists, perhaps classed as druggists and pharmacists as for instance in Germany and other countries. One will carry on the business on a purely commercial basis including the sale of various side lines; the other will devote himself to professional ethical pharmacy, drugs, chemicals, galenicals, prescription work, chemical and microscopical analysis, etc.

To bring about such a rather ideal condition of which I am dreaming, it will be absolutely necessary that the education of this ethical and professional pharmacist must be equal to that of the physician. The pre-requisite clause of one year high school education or fifteen Regents counts necessary for the admission to the pharmaceutical schools has greatly benefited and elevated pharmacy. We must howsoever not stop here and should in due time, the sooner the better, require sixty Regents counts for admission to the colleges.

During the year I have been strongly impressed with the following condition in pharmacy which most certainly should be remedied:

1. *Duplicate Specialties.*—The shelves in our pharmacies are continually being loaded with duplicate specialties. No sooner one manufacturer exploits a specialty, than dozens of other manufacturers prepare and market practically the same articles—and the pharmacist, to his sorrow, has to stock them all.

2. *New Chemical Products.*—Although the market is not flooded as much as in former years, although the fake chemicals have disappeared, new chemicals are still being marketed. In my opinion the label should, besides the trade-mark name, contain the chemical name and perhaps the formula and also the dose as a safeguard for physician, pharmacist and patient. The habit of some manufacturers of marketing their preparations in tablet form stamped with initials or in colored capsules most certainly is to be condemned.

3. *Similarity of Names.*—The coined trade-mark names in a great many instances are too nearly alike and might even cause dangerous errors, as for instance, in Lythol, Lysol and Laxol. Similarity in chemical names should also be avoided. Only lately a case came to my notice where a physician prescribed Acid. Thyminic. and the pharmacist dispensed Acid. Thymic (thymol).

4. *Extemporaneous Galenical Preparations from Fluidextracts*.—I most emphatically censure the manufacturing houses for printing on the labels of their fluidextracts not only formulas for the extemporaneous preparation of syrups, tinctures and wines, but even infusions. Imagine an infusion of digitalis prepared from the fluidextract. Such a procedure, in my opinion, ought to be considered a criminal offense. May the originator of this ingenious idea "Rest in Peace." He certainly started the lowering and the downfall of pharmaceutical practice and technique.

Recommendations to the individual practical and dispensing pharmacist.

1. The study of synonyms, pharmaceutical, chemical and botanical.
2. The study of incompatibility, which is very useful behind the prescription counter.
3. The study of pharmaceutical history, especially etymology, origin and history of drugs. It is surprising to learn how few pharmacists know, for instance, the history and origin of such an every-day article as Rochelle salt.
4. Do not advertise and push patent medicines. If you have to sell them, keep them out of sight.

5. Specialize in drugs and prescriptions. "Don't be a jack of all trades, but try to be a master of one!"

6. Strict adherence to the U. S. P. and N. F.

Since these two books have become legal standards, we must strictly adhere to them and suggest improvements if possible. It is also our duty to instil into the physician respect and confidence for these official preparations so that he will prescribe them.

7. More attention should be paid to the storage of drugs, galenicals and chemicals. Even the U. S. P. might pay more attention to this. The average druggist continues to keep his essential oils in stock bottles on the top shelf exposed to the light, and he continues to keep his ammonium carbonate in a drawer and his syrups near the radiator.

8. *Preparation of Galenicals*.—Above all, the pharmacist, in order to deserve the name of pharmacist, should prepare his own galenicals. From reliable sources I am informed, sorry to say, that 75 per cent. of the druggists in the United States buy all their galenical preparations, including such simples as paregoric, spirit of peppermint and tincture of ginger. It is furthermore absolutely necessary that the pharmacist keep up his stock of U. S. P. and N. F. preparations so as not to disappoint the physician and patient.

9. *Pharmaceutical Library*.—I shall earnestly recommend to the pharmacist the acquisition of a pharmaceutical library of books and journals. It is surprising to note how little attention is paid to this. How a pharmacist can get along with merely a copy of the U. S. P. and N. F., the latest editions of which he is compelled to possess according to most state laws, I am at a loss to understand.

10. Last, but not least, the retail pharmacist should bring out his individuality. Prove to and impress upon the physician and the public that you fully possess the necessary pharmaceutical knowledge, that you are worthy of their confidence, in fact, that you are a better pharmacist than your competitor. Such is especially true if the latter keeps a cut-rate store, or happens to be a corporation store. This individuality, in my opinion, is the salvation of the small retail pharmacist, especially the one who has a family-trade and who comes in personal contact with his customers. They might patronize the chain or department stores if in need of a cut-rate article, but they will patronize the pharmacist who has gained their respect and confidence, who has established his individuality and who has proven that he pays special attention to drugs, chemicals, galenicals and prescriptions.

This will be a struggle of knowledge against capital.

Let us hope that knowledge will be the victor, at least the saviour of practical pharmacy and dispensing!

Recommendations to the Association.—There are several matters which I have given a good deal of thought during my rather short term of office and which I herewith beg to present for the consideration of the Association.

1. *Roll of Honor of Contributors.*—As far as I can learn every chairman of this Section has had a great deal of trouble to obtain papers. It is true that through the establishment of the branches and of the Bulletin a great many members can now be reached. My experience, however, has been that, in order to receive an answer, it is necessary to personally address them. A list of those members who have contributed papers or have taken part in the discussions in the Section of Practical Pharmacy and Dispensing, a so-called "roll of honor" would certainly be very helpful to the officers of this Section, and can be transmitted to the following chairman and kept corrected.

2. *Distribution of Officers.*—If it could possibly be arranged that the three officers of the Section (the Chairman, the Associate and the Secretary), could be selected from different parts of the U. S., this would, in my opinion, be an advantage, as each one could take care of a certain territory. Such was our "modus operandi" this year.

3. *Papers to be Referred to the Scientific Section.*—As has already been suggested by Dunning at a N. Y. meeting in 1907, I again beg to recommend to refer papers and problems to the Scientific Section, if deemed necessary.

4. *Publication of a Recipe Book.*—I would earnestly recommend that the Association would publish a "recipe book" as originally proposed (Bulletin, Aug., 1909, p. 248), by Prof. Hynson, the father of the Section of Practical Pharmacy and Dispensing. Much has been said pro and con in our Committee on Unofficial Standards, to whom this matter was referred, but you will find that the practical pharmacists on this committee are in favor of such a book. A "recipe book" of reliable formulas of unofficial preparations is badly needed in the U. S., and it is the duty of the A. Ph. A. to go on record and publish such a book, which incidentally might be a source of additional revenue.

In conclusion let me hope that I have not tired you with my somewhat lengthy address, and also let me hope that the program which I have presented with the aid of my associates, with the co-operation of the contributors will help to make the Richmond meeting the most enthusiastic, the most interesting and the most instructive in the history of the A. Ph. A.: Let it be another verification of the motto of our Association "To improve and advance improvements for the benefit of all."

The Chair called for action on the address as read.

Mr. Hynson said he hoped no one would object to the "father" of the Section saying a few words in regard to this able address of the Chairman. He simply wanted to call attention to the fact that it was gratifying to see a man of Mr. Raubenheimer's ability and experience taking so much interest in the Association and its work. He moved that the address be referred to a special committee of three, to be appointed by the Chair, and that this committee's report be made a special order in preference to the regular program at to-morrow morning's session, and to be considered at the beginning of the session.

This motion was seconded by Mr. Apple and carried, and the Chair said he would appoint on this committee Messrs. Henry P. Hynson, George M. Beringer and J. P. Remington.

Mr. Raubenheimer resumed the Chair and called on Mr. Sayre to present a paper upon the question of regard for official standards.

Mr. Sayre presented his subject as follows :

"DO PHARMACISTS PROPERLY REGARD THE OFFICIAL STANDARDS?"

BY L. E. SAYRE.

In a communication from an official connected with the administration of the Food and Drugs Law, an opinion was given which shows the attitude of some who may be considered as somewhat disinterested parties, concerning the question of the improvement of the status of pharmacy through the enforcement of the Food and Drugs Law. He said that in order to improve Pharmacy, it would be necessary "to reform the druggist himself." Whether this is a just criticism or not, we need not stop to consider. We are inclined to the opinion, however, that such a view is characteristic of those who are inclined to be pessimistic and may not be an authority on the present or future status of pharmacy. While we are willing to accept the honest criticism of disinterested parties, we must recognize that some disinterested parties have an antagonistic spirit, and their opinion is probably not based upon facts unmingled with prejudice. Our own opinion is that we have in the profession of pharmacy a very large majority who are aiming to observe the standards of the Pharmacopœia, and who are doing all in their power to resist the temptation, to meet fierce competition on the part of the unscrupulous dealer, who adopts disingenuous methods by injecting into the market substandard and illegal materials. This element of competition in the business of pharmacy, the Food and Drugs Law is honestly trying to combat. It is a competition which is one of the greatest hindrances to the profession and a direct detriment to public welfare.

In order to show how far pharmacists properly regard standards, it is evident that one would be obliged to report on all the preparations dispensed by all of the druggists of the United States. This is of course impossible. It is even impossible to accomplish such a task in an individual state. It is, however, possible to make a partial or sectional investigation which may be of some value. As we are, in a measure, familiar with Pharmacy in Kansas, we can show perhaps how far this particular section contributes to an answer to the question. During the past year ending April 5, 1910, over 2100 samples of drugs have been examined in the Kansas Drug Laboratory and in accordance with the requirements of the Kansas Food and Drugs Law, these examinations have been reported. A condensed and partial report of these has been incorporated in another paper before this Association, but for the present paper, we have compiled more definite statistics from the files of the Board of Health, Capitol Building, Topeka, and present these statistics for what they are worth. It should be noted in this connection that inspectors are instructed to collect only *suspicious samples*, and therefore the percentage of adulterations in the subjoined table indicate only the percentage of sub-standard materials in *suspicious drug products* collected by the inspector and sent

into the laboratory for examination. I desire to state that since the class known as the saloon druggists has disappeared from the state, the percentage of standard drugs has increased in proportion.

Added to this table, we give a list of samples of Compound Tincture of Gentian, collected in New York, Baltimore, and Philadelphia, sent us by the courtesy of the United States Inspectors at our request. These were collected in order to form some idea as to how uniformly such a common preparation as this official one was made and dispensed by druggists in certain sections in the east. We shall tabulate these results as follows, and present them merely for what they are worth :

COMPOUND TINCTURE OF GENTIAN.

Insp. No.	City.	Sp. Gr. 25° C.	Per Cent. Alcohol.	Color	Extractive in 100 Cc.
2771-B.....	New York	.9312	55.0	Dark Red	5.194
2773-B.....	New York	.9293	55.0	Red	4.048
2777-B.....	New York	.9404	53.25	Dark Red	4.990
10310-B.....	New York	.9386	54.25	Dark Red	5.033
10315-B.....	New York	.9346	54.25	Red	4.369
10808-B.....	Baltimore	.9558	42.0	Red	3.472
10810-B.....	Baltimore	.9208	53.75	Dark Red	2.903
10813-B.....	Baltimore	.9386	48.75	Red	2.452
10814-B.....	Baltimore	.9361	54.5	Red	5.444
10816-B.....	Baltimore	.9297	53.75	Red	2.654
11903-B.....	Philadelphia	.9344	55.0	Red	4.547
11907-B.....	Philadelphia	.9408	54.0	Red	5.604
11905-B.....	Philadelphia	.9311	55.0	Dark Red	3.912
11910-B.....	Philadelphia	.9305	53.25	Dark Red	5.336
11912-B.....	Philadelphia	.9391	52.25	Dark Red	4.369
Standard Preparations *		.9418	56.5	Dark Red	5.5

It should be noted that inspectors in Kansas are finding that certain disingenuous methods are being used to accommodate a certain portion of the public which creates a demand for cheap goods and which refuses to pay the price for the pure article. It is deplorable to relate, that sooner or later, the dealer surrenders to a temptation to supply this demand. As soon as *one* yields to it, it opens the door for others, and thus they multiply. Recently we have met sub-standard preparations belonging to this class, preparations such as are used commonly by farmers and those ordinarily kept in the family stores. Singling out only one of these, we would give as an example Spirit of Camphor. The inspectors report that they are finding numerous cases in the State of Kansas where a cheap Spirit of Camphor is dispensed under the following labels :

1. "A mixture—Camphor, Alcohol and Water."
2. "A mixture—Spirit, Camphor and Water."

* Made in Kansas University Laboratory from official material and by official formula.

It is needless to say that the administrators of the Food and Drugs Law should do everything in their power to put a stop to such unscrupulous dealings with the public. If we admit of such disingenuous methods of competition, we are introducing an element in pharmacy which is a direct menace to public health.

REPORT OF DRUGS AND MEDICINES ANALYZED BY THE DRUG LABORATORIES.

KANSAS STATE BOARD OF HEALTH. KANSAS UNIVERSITY.

Under the Food and Drugs Law, February 14, 1907, Examination of Suspicious Samples.

Name of Drug.	No. Samples Ex.	No Passed.	No. Illegal.
Alcohol	50	38	12
Alum, powdered.....	3	2	1
Arnica, tincture	23	16	7
Antimony, wine of	2	0	2
Arsenic, pills.....	1	1	0
Acetic acid.....	1	1	0
Aletris, fluidextract	1	0	1
Aloin.....	11	9	2
Acetanilide, powdered.....	1	1	0
Asafetida.....	1	0	1
Ammonia water.....	3	0	3
Ammonium valerate, elixir of.....	2	1	1
Ammonium acetate.....	1	1	0
Ammonium benzoate.....	1	0	1
Ammonia, aromatic spirit of.....	3	3	0
Aloin and belladonna comp.....	1	0	1
Aconite tincture	2	0	2
Aconite root, fluidextract	2	0	2
Aconite root, powdered extract	1	0	1
Aconite leaves, extract	1	0	1
Bay Rum.....	11	9	2
Bees wax	1	0	1
Borax.....	5	1	4
Beef, iron and wine.....	25	14	11
Boric acid	1	1	0
Buchu, fluidextract	1	0	1
Bear's foot, fluidextract	1	0	1
Balsam of copaiba.....	3	3	0
Belladonna, fluidextract	7	0	7
Belladonna root.....	7	3	4
Belladonna ext. pills	1	0	1
Belladonna leaf tincture	2	1	1
Bismuth, sub-carbonate	2	2	0
Bismuth, sub-nitrate.....	3	3	0
Chloroform, spirit.....	1	0	1
Calumba, tincture	25	7	18
Carbolic acid	23	8	15
Capsicum	1	1	0

Name of Drugs.	No. Samples Ex.	No. Passed.	No. Illegal.
Camphor, spirit.....	435	141	294
Citrine, ointment.....	6	2	4
Cream of Tartar.....	2	2	0
Cantharides, ointment.....	1	1	0
Cera alba.....	1	0	1
Citrate of caffeine pills.....	1	1	0
Coca leaves, fluidextract.....	1	1	0
Cantharides, tincture.....	1	1	0
Cotton root bark, fluidextract.....	2	0	2
Chloral, hydrated.....	8	5	3
Creosote.....	5	1	4
Calcium hypophosphite.....	9	3	6
Camphorated oil.....	1	1	0
Conium fruit.....	14	9	5
Castor oil.....	2	1	1
Coca.....	16	12	4
Cinchona bark.....	34	23	11
Cinchona, tincture.....	2	0	2
Cinchona, ferrated, elixir.....	1	0	1
Cinchonidine sulphate, pills.....	2	1	1
Capsicum, tincture.....	4	2	2
Calomel.....	3	3	0
Cubebs, powdered.....	1	0	1
Creosote (commercial).....	1	1	0
Cactus grandiflora.....	1	0	1
Crane's bill, fluidextract.....	1	0	1
Camphor, monobromated, tablets.....	1	1	0
Colchicum root.....	18	15	3
Colchicum seed.....	11	7	4
Cannabis indica, ext. granules.....	1	0	1
Lamina, fluidextract.....	1	0	1
Ferruginous pills.....	2	1	1
Formaldehyde.....	5	4	1
Fowler's solution.....	3	3	0
Glycerin.....	8	1	7
Ginger, tincture.....	68	34	34
Gentian compound tincture.....	44	18	26
Glycyrrhiza powders.....	1	1	0
Gaultheria, oil of.....	3	2	1
Hydrogen peroxide.....	11	11	0
Hydrochloric acid.....	3	0	3
Hydrocyanic acid, dil.....	1	0	1
Hypophosphites, comp. syrup of.....	1	0	1
Hydrastis, fluidextract.....	4	1	3
Hydrastis, powdered.....	23	0	23
Hioscyamus, powdered extract.....	1	0	1
Hioscyamus.....	21	15	6
Iodine, tincture.....	496	216	208
Iodine, ointment.....	2	0	2
Iodide of iron syrup.....	18	11	7

Name of Drugs.	No. Samplex Ex.	No. Passed.	No. Illegal.
Iron, quinine and strychnine.	21	3	18
Iron, dialyzed.....	2	0	2
Iron, nitrogenized.....	1	0	1
Iron by hydrogen	8	3	5
Iron (soluble citrate) and quinine	2	2	0
Iron and quinine citrate pill	1	1	0
Jaborandi, fluidextract	1	0	1
Lime, chlorinated.....	9	4	5
Lime water	21	10	11
Liverwort, fluidextract	1	0	1
Laudanum	1	1	0
Lemon, spirit.....	1	0	1
Mercury, yellow oxide.....	7	7	0
Mercury, unguentum, nitrate of.....	1	0	1
Mercury mass.....	4	0	4
Mercurial ointment	8	3	5
Menthol	8	4	4
Male fern, oil of	1	0	1
Nitrohydrochloric acid.....	3	3	0
Nitroglycerin tablets.....	1	0	1
Nux vomica.....	23	6	17
Nux vomica, fluidextract	2	0	2
Nux vomica, tincture.....	4	4	0
Nitrous ether, concentrated.....	2	0	2
Nitre, sweet spirit	55	6	49
Orange, tincture	1	0	1
Olive oil.....	4	1	3
Opium	1	0	1
Opium, powder	1	1	0
Opium, tincture.....	9	1	8
Opium, wine of	1	1	0
Peppermint essence	197	48	149
Pepsin, bismuth and strychnine (elixir of and similar products).....	39	10	29
Pedophyllin ..	7	3	4
Peach-kernel oil	1	1	0
Pancreatin	4	3	1
Petrolatum	1	0	1
Phosphoric acid, dil.....	11	8	3
Paregoric	3	1	2
Pepsin....	10	8	2
Pepsin, lactated.....	1	0	1
Phosphorus and nux vomica (pills)	1	1	0
Phenol	2	2	0
Peppermint, oil of.....	6	6	0
Potassium bromide.....	12	11	1
Potassium citrate	1	0	1
Potassium carbonate	7	6	1
Potassium bitartrate	2	1	1
Potassium iodide	1	0	1

Name of Drugs.	No. Samples Ex.	No. Passed.	No. Illega ^l .
Potassium bromide, elixir	11	10	1
Quassia, fluidextract	1	0	1
Quinine sulphate	9	9	0
Quinine sulphate (pills)	3	3	0
Quinine bisulphate	1	0	1
Rosin cerate	1	0	1
Rochelle salt	1	1	0
Rue, fluidextract	1	0	1
Rhubarb, syrup of	1	0	1
Rhubarb, powdered	3	3	0
Sassafras, oil of	3	3	0
Stramonium	7	1	6
Sodium bicarbonate and calomel tablets	1	0	1
Seidlitz powder	5	5	0
Strychnine, tablet triturates	1	1	0
Sodium carbonate	5	1	4
Soap	5	2	3
Soda, arsenite of	1	1	0
Sweet almonds, oil of	2	1	1
Sweet oil	14	11	3
Sanguinaria, tincture	1	1	0
Senega, fluidextract	1	0	1
Sulphur, lac	8	4	4
Sulphur, precipitated	12	8	4
Turkey corn, fluidextract	1	0	1
Tannic acid	7	0	7
Turpentine	2	1	1
Tartar, salt of (potassium carbonate)	2	1	1
Veratrum viride, tincture	1	1	1
Wild cherry, syrup of	2	0	2
White wax	13	0	13
Yellow wax	3	2	1
Witch hazel	4	0	1
Zinc sulphate	1	0	1
Zinc oxide ointment	1	0	1
Zinc	3	3	0
Totals	2,182	921	1,261

It will be seen from the above that 57.79 per cent. of the drug materials examined were illegal, and but 42.21 per cent. passed the requirements.

In addition to the above there have been examined 458 samples of patent proprietaries, liquors and spices, many of which were misbranded, adulterated or deteriorated. This makes a total of 2,640 analyses reported to this office.

The Chair called for action upon this very interesting paper.

Mr. Cliffe said he did not understand from Mr. Sayre the time covered by the collection of samples; Mr. Sayre responded that it was one year in April last.

Mr. Apple wanted to know if the articles sold to the retailers were to be dispensed in packages as received from the manufacturer, or sold by the pharmacists in smaller packages; and if so, how they were to be labeled. Mr. Sayre responded that they were put out in the case and labeled, and sold in the original package to the consumer.

The Chair stated that, without objection, the paper would be received and referred to the Publication Committee, and it was so ordered.

The next item on the program, "The Necessity of a Thorough Understanding of the Pharmacopœia to the Successful Practice of Pharmacy," was a paper which the Chair said had been put in print by the author, Mr. Whorton, of Alabama. That gentleman presented his subject as follows:

THE NECESSITY OF A THOROUGH PHARMACOPŒIAL UNDERSTANDING TO THE SUCCESSFUL PRACTICE OF PHARMACY.

BY C. WHORTON, GADSDEN, ALA.

To some of those who have been blessed with a location near the center of pharmaceutical activities and having all around you the most thorough advantages in the great schools of Pharmacy, which have for years and years sent out, in all directions, men equipped to do this work, my subject may seem derelict and it might be right that I here offer you an apology for my selection of such a subject. My experience in Pharmacy covers only six years of practice and eighteen months in the Alabama Polytechnic Institute Department of Pharmacy, and I have never had the time and opportunity to study the needs of our profession outside of my native state and that loved Southland; but, gentlemen, I am quite sure this subject applies to us and, if I can offer something that will lead us to better things within Dixie's borders, I will feel a thousand times repaid for this effort.

Two years ago I read an editorial from the pen of Dr. Hallberg, in the official organ of this Association, which was very pessimistic in regard to the future outlook of the A. Ph. A. in the South, and at that time, I felt it my duty to take issue with him regarding Pharmacy within my native borders. He made the assertion that all efforts to enlist the South in the work of the A. Ph. A. had proven futile, and that it was merely a waste of time and effort to fool with us down there.

We are all natural lovers of our own section, where it has been our fortune to be placed, and there are none of us, gentlemen, who could hold altogether impartial views; but I can assert most truthfully here that the A. Ph. A. never made the slightest effort to get me within its ranks and has never put forth any real telling one to enlist other druggists of my state and I have had to write to the General Secretary to get information to furnish other men who were groping in the darkness and who were seeking their way into this, the great "Source of all good things Pharmaceutic."

My people are interested in this work and are becoming more and more so each day. They are seeking a way to correct these errors. All that is necessary is a little work of education on the part of this Association, and this missionary work means much to practical pharmacy in the South and a richer field for a great harvest is not open to-day to the A. Ph. A. This Association is the original source of education, and the member who attends from year to year, recognizes after going through each convention that he has learned still more of the greatness of the Pharmacopœia, the child of this Association. So we find the source of this knowledge, and know that to receive its benefits we must go to the source.

Pharmacy is often given the wrong definition, not only by the laity, but by the members of our profession, and of the medical profession. We so often think of the pharmacist in the light of a mere machine, wound up each morning early, pouring ready-made dopes and nostrums from one bottle to another and counting pills and tablets, that are usually insoluble—thus running automatically until the late hours of night, when the spring completely runs down and he locks up his shop of accommodation until he can pull a few short hours from the land of slumber, which serves only to wind him up for another day of unprofitable toil. This seems to be the conception of some as to the pharmacist, and it seems sometimes to be the pharmacist's own conception of himself.

Let us see how near this comes to filling the place of a real practical pharmacist.

A practical pharmacist is the man who really practices the art of pharmacy. The art of pharmacy is the art of separating from nature's crude store medicines for treatment of diseases, of combining these into suitable preparations for application, of testing and assaying them so as to guarantee their potency and standardize them, and lastly to dispense them as they are prescribed by the physician, who is the expert that diagnoses and applies the remedies.

When we look at existing conditions we see that this lack of pharmaceutical knowledge has taken from pharmacy all that is practical and and has left only a part of one division of the art, and that is dispensing; even then he is dispensing some other man's secret combination that is based only upon deception and superstition and not at all upon education and progress.

I can direct you to schools of pharmacy in the South to-day which use a very small compiled book of a few of the U. S. P.'s formulæ for their course of education upon the Pharmacopœia. They are not even required to buy a Pharmacopœia; and can we wonder that scores of these graduates go out into practice and sometimes continue their career without a copy of this official guide for pharmacists? There he gets about forty easy formulæ to work out in his whole course upon the Pharmacopœia and

then goes out thoroughly versed upon all things pertaining to this book. He can't even tell when a preparation is official and therefore drifts into the easy-going tide of dispensing anybody's cure-alls.

We have schools advertising to give you all the knowledge that has ever been ferreted out, in pharmacy and chemistry, in four or six months, and and then can we wonder at our professional position?

There are many other gloomy aspects to this situation. A leading druggist in my city has a prescription for infusion of digitalis. He hunted all over his Fldext. bottle for a formula to prepare his infusion. After failing in his search he stepped out of his back door and asked to see my Fldext. Digitalis. I told him I didn't have any of the fluidextract, that my doctors all prescribed the infusion. He informed me that that was what he was hunting and that he knew of no other way of making it. "Where is your Pharmacopœia?" I asked. His answer came in these astounding words, "I have none, I don't need any, I make all my syrups, tinctures, infusions, etc., from the formulæ on the Fldext. bottle." I found out that he had an old dispensatory of some kind dating back thirty years, but that it had been misplaced and he couldn't find it. Again, a druggist friend of mine had a partner who left him and carried with him some formulæ of the U. S. P. which he has changed from the metric to its equivalent in the apothecary system. So this druggist came around and asked me for this formula already "figured out," as his partner had carried his off and he didn't want to take the time and trouble of "figuring it out" again. The truth is, he didn't know anything about the metric system, the U. S. P.'s adopted system of weights and measures. He couldn't do the simple computing necessary to change the metric into the old system of weights and measures.

Ninety per cent. of the pharmacists of my state can't tell you what aromatic principle it is that gives the characteristic odor to Fowler's Solution, and they will pay usually from fifty to one hundred per cent. more for the product of some pharmaceutical house than they could make it for, when it is a very simple process.

Again, they will run out of the simplest elixir and wait from two to three weeks until they can order and "get in" from some manufacturing house, when they could turn over a few pages in their Pharmacopœia and make the product in thirty minutes.

I merely refer to these known instances to show you the real conditions as they exist. Their appalling ignorance of the Pharmacopœia and also the great loss and hardship their ignorance imposes upon the retail druggists and upon themselves.

It is the source of all the greatest obstacles that to-day confront us and relieves our calling of its brightest aspect. It is the grim monster that hovers over our entire business career ready always to grab from our cash register the profits that should go to the substantial support and educa-

tion of our own families, and it is the chief cause of the great nostrum evil that has, at almost too late a date, awakened us to realization of our position in the world of medicine. It has lost for us so much of the confidence once given us by the physician and rightfully too has it lost for us this confidence because ignorance should and always will go down before the rigid judgment of education and scientific progress.

After realizing these things we catch ourselves wondering why such conditions exist. Is it the fault of the retail druggist? Who to-day is responsible for the lack of pharmacopœial knowledge? Isn't this a moral issue that involves more than an individual responsibility? The old adage, "What is everybody's business is nobody's business," is so true in this case and we can't wait and expect each individual to clear himself of this indictment of ignorance. We must, as an Association, realize that this great responsibility is upon our shoulders and that we are held for the condition of pharmacy as it exists to-day. That we have been negligent in this work is very evident by these conditions, and it should be almost criminal to find a pharmacy and a pharmacist without the protection, both professional and financial of the Pharmacopœia.

This Association, and this section of it more than any other, should take the initiative in this work and educate American Pharmacy in the real art of this profession and no longer allow men to shield their ignorance with the helmet "A Pharmacist" when a more false position never existed and when he is no more accomplished than a grocery clerk.

Then let the American Pharmaceutical Association take up the work as if it meant to accomplish something, first, by going out after American Pharmacists, bringing them under the educating influence of this great body of scientific men, teach them that the word Pharmacopœia is not a myth and that the art of pharmacy with all its branches belongs exclusively to the pharmacists.

I again say, gentlemen, that to this section, more than any other does this great propaganda work belong, because we discuss and are supposed to promote "Practical Pharmacy" and Practical Pharmacy requires a thorough knowledge and use of the U. S. P.

We here have many discussions of practical work, new and improved methods. Almost all changes in "Modus Operandi," of the most successful pharmacists of this great country are brought before this section. Many suggestions and points of education that we can learn only from the brightest men of our calling are brought to us here and nowhere else. We here, and here only, get the benefit of the successful men of pharmacy, and why couldn't the man who has allowed himself to fall into the pharmaceutical lethargy get the advantage of all this learning and take on new life, become enthused with this work and learn to love the duties of his chosen calling? This is made possible only by his knowing pharmacy and really practicing it.

We enjoy the methods used in preparing medicine, for it is interesting to any investigative mind. It is a source of pleasure to study and work out the different methods of separation. To be original and try to improve on the old ones, at the same time being as perfect in the work. It makes us realize the fact that the Great Creator endowed us all with a supreme power and gives us that great desire down deep in our hearts to excel.

There are many men today within the realm of pharmacy who, if they realized what advantages lay between the bindings of the U. S. P. and knew how soon they could acquaint themselves with at least some of its work and who could realize how interesting the work was after once getting into it, that would eagerly grasp the opportunity. They seem to think that it requires some great divine power to accomplish these things and as in the case of ignorance, all down the ages there is an unseen power that instills doubt and superstition into their very beings. Something wonderful, something magical attached to this great work of combining and preparing medicines. These people that have been singularly blessed with this divine power to do these things are looked upon with awe by the ignorant man of pharmacy and they wonder how they accomplish such great feats as making a fluidextract or even a very simple elixir. That they wield a magic wand over the botanical kingdom and make it yield its healing properties is quite evident; and that they have the aid of the Spirit land in their wonderful accomplishments in chemistry is also evident.

I say to you to-day, gentlemen, that there are men in our ranks who are as ignorant as the common man of the laity.

The President of the Alabama Medical Association criticized a speech which one of our pharmacists made before the society in Mobile this year, because the substance of his address was confined to the relative position the doctor and the druggists should assume, when this doctor thought the whole burden of Alabama pharmacists to-day should be to throw off this yoke of ignorance, become free from this bondage of the eastern manufacturers of nostrums, strive to a higher plane of education, arise to the needs of the hour, and become men of pharmaceutical knowledge and therefore men of pharmaceutical power. Then these small grievances of the doctor and the druggist will vanish as the darkness of the night vanishes before the light of the morning sun.

Then we will need no controversy between these professions because the light of education shows both of us clearly our way and then our own profession will accomplish great things and the fetters which to-day bind it will forever be cast from it.

Let us take up the work of helping our brother and when the new U. S. P. comes out in all its completeness, let us each take it upon ourselves to put it into the hands of every pharmacist in the United States, tell him

it is his Bible, it is his guide, it is his stay. Take it, study it and learn to love it. Apply it to his every want. Then we have really accomplished something great for "Practical Pharmacy," in this country of ours.

The Chair called for action upon this interesting paper on conditions in Alabama, and invited discussion upon same, but none was offered.

The paper was ordered to take the usual course.

A paper by R. H. Needham, of Fort Worth, Texas, on the subject of "Drugs and Preparations Which Go to Make Up Prescriptions," was read by title, in the absence of the writer, and referred to the Publication Committee. The same course was pursued in regard to two other papers, the authors of which were not present, namely, "Quality of Some Crude Drugs Examined During 1909" by H. Engelhardt and "Quality Versus Quantity of the U. S. P. and N. F. Preparations," by Abraham Weinstein.

"Fluidextracts and Repercolation" was the title of the next paper on the program, and Mr. Arny, the senior author, presented the subject as follows:

FLUIDEXTRACTS AND REPERCOLATION.

BY H. V. ARNY AND F. H. OXLEY.

Introduction. To discuss the topic already the subject of much study by some of the master minds of American pharmacy and the cause of valuable discussions at previous sessions of this Association, seems like treading upon the holy ground of pharmacy and suggests the adage ending: "where angels fear to tread."

During the past four years, however, one of us had some experiences with the subject which he offers more by way of suggestion than as a critical analysis of this most important branch of pharmaceutical manipulation.

With all due respect for the past Committees on Revision and with full appreciation of their devoted services in the cause of pharmaceutical progress, study of the processes of preparing fluidextracts given in the Pharmacopœias (both the eighth edition and that of 1890) we are constrained to ask;—are most of these receipts practical?

Those of us who as retailers have made a pint, quart or half gallon of an official fluidextract and have spent a day in the back room stirring the residual weak percolate, after distillation of the alcohol—stirring this weak percolate as it slowly evaporates by water-bath heat—appreciate that the game is scarcely worth the candle, and this, difficult as it is, when compared with the pharmacopœial directions given for 28 fluidextracts, "evaporate the residue at a temperature not exceeding 50° C." is merely a pastime.

As stated by one of us elsewhere:

"As to the 28 fluidextracts, the weak percolates of which are to be evaporated at a temperature of 50° C., it must be said that this process is impossible for the retailer. Assuming the intention is to recover the

alcohol by distillation, that operation can take place at 50° C. only when carried on in a vacuum pan, a piece of apparatus the cost of which precludes its use anywhere save in large factories. If the alcohol is to be evaporated and not distilled, the same question as to waste applies here; while the simple act of evaporation of the weak percolate in open air at 50° C. is a task so tedious as to be almost impossible.

In short, this direction "evaporate at 50° C." limits the process to those having vacuum pans, and if rumor be true, our friends the manufacturers, practically the only pharmaceutical possessors of this expensive form of apparatus, do not use the official process any way.

Early in the retail career, one of us appreciated that the process of "percolation with partial evaporation" was not for the retailer, and he turned with gladness to the seemingly complex but in truth exceedingly simple process of repercolation, and in school and out he has been preaching the gospel of repercolation.

But during the past few years he has conducted the experiments reported below and now has to reluctantly admit that unless his data are faulty, his former ideas regarding the efficiency of repercolation must be radically changed.

In short, while the practicability and simplicity of the process makes it still the ideal way of making fluidextracts, the question now before us is, *Does the volume of 100 Cc. of the repercolated fluidextract represent the activity of 100 Gm. of the drug?*

REPERCOLATION.

In view of the fact that practically every paper on repercolation was read before this Association, a recital of the magnificent work already done on the subject is scarcely necessary. And yet we cannot proceed further without mention of classic papers on it or allied subjects by Squibb (Proceedings, A. Ph. A., 13, 201; 14, 81; 15, 391; 18, 181; 26, 708), by Diehl (Proceedings, A. Ph. A., 26, 681; 27, 727; 28, 424) by Lloyd (Proceedings, A. Ph. A., 27, 682) and by Oldberg (Proceedings A. Ph. A., 32, 388) and the work done by Sayre and associates (Druggists Circular 41, pp. 119, 147 and 212) in connection with the problem of admitting 50 per cent. tinctures into the Pharmacopœia of 1850.

In discussing these several pieces of research, we will quote only those experiments having particular bearing on the subject of this paper, which, as suggested above, can be summed up in the query: *Do 100 Cc. of the repercolated fluidextract represent the activity of 100 Gm. of the drug?*

The phrase "total activity" is intentionally omitted for it is not the purpose of the paper to discuss the best means of extracting the full activity of a given drug. That is largely a matter of choice of the appropriate menstruum and knowing full well the amount of patient work done by the members of the past Committees on Revision in this direction, we

are all ready to concede that the official menstrua are usually the best for the particular drug.

Our query can therefore be altered to read :

1. Do 100 Cc. of the reperlcolated fluidextract contain all the extractive that can be removed from 100 Gm. of the drug by the official menstruum?

2. Does it (the reperlcolated fluidextract) contain as much extractive as does a fluidextract (from same batch of drug) made by the official (percolation with partial evaporation) process?

Before proceeding to answer these questions from data collected by the writers, a résumé of methods employed by us and of data reported by previous investigators might be in order.

As to methods employed, the most feasible scheme (and that followed with slight differences by all investigators on the subject) was the exhaustion of a certain batch of drug with the official menstruum and estimation of the extractive thus removed from the drug, by evaporation of an aliquot part of the percolate. Having thus established the quantity of extractive in the drug, subsequent batches of the drug were made into fluidextract by reperlcolation and the amount of extractive in such fluidextract compared with the above mentioned amount of extractive, that was possible to extract from the drug with the official menstruum.

None of us, as yet (save Farr and Wright), have tried what, under our present system of alkaloidal standardization, would be the most scientific method of comparison; assay of the particular drug and assay of the finished product made by processes of the Pharmacopœia. As far as the present writers are concerned, the work of assay of about fifty samples of drug or fluidextract was beyond the limited time at their disposal. But one of the main objects of this paper is to suggest to the next Revision Committee an attempt to collect data on this very important method of comparison by systematic co-operation.

It seems to us that our friends, the manufacturers, could throw most important light on this topic without prejudice to their own interests or publicity of that part of their special manipulations which have commercial value.

As to the estimation of extractive in the percolates, all the investigators adopted the obvious plan of evaporating an aliquot part of the liquid at a temperature low enough to prevent possibility of decomposition. Not to burden this paper with details, the most carefully thought plan was that suggested in the paper by Professor Snyre (D. C. 41, 147), to which those interested are referred. Since the only drug used by the writers was the comparatively stable gentian, their method was evaporation of 10 Cc. of the liquid in tared beaker glasses in a drying oven, kept steadily at temperature between 100° and 110° C., and of course each estimation was controlled by running a duplicate.

The question of complete exhaustion is possibly worth a paragraph. Squibb (*A. Ph. A.* 26, 713) says the drug is never completely exhausted; that 5 per cent. to 10 per cent. of the activity always remains in the marc; that hence it would be good to percolate 8000 grains of drug to get one pint of fluidextract. As to the amount of percolate required for exhaustion of drug he reports (*A. Ph. A.* 18, 164) that 16 troy ounces aconite take at least 13 pints of percolate for complete exhaustion; that 16 troy ounces wild cherry are exhausted when 16 pints of percolate have been obtained; and that 16 ounces of cinchona show bitterness even in the 17th pint of percolate; the figures referring to the menstrua directed by the *Pharmacopœia* of 1860.

These figures are evidently his extremes, for later (*A. Ph. A.* 26, 726) in a general summary of conclusions he states that to exhaust a drug, percolates weighing from $3\frac{1}{2}$ to 7 times the weight of the drug must be obtained. Sayre (*D. C.* 47, 119) goes deeply into this important subject, citing among others, Campbell's unproven claim that he could exhaust 16 troy ounces drug in 16 fluid ounces percolate; Squibb's figures from 6 drugs each of which took 3 to 4 times as much percolate to exhaust as amount of drug used: Farr and Wright's work showing that in percolating 100 grammes each of twelve different alkaloidal drugs, there was an appreciable amount of alkaloid in each case in the fifth 100 Cc. of percolate.

These varying statements are impressive as showing what great influence the skill and speed of percolation has on amount of percolate necessary to produce exhaustion. Sayre quotes from the testimony of one of us (*Proc. A. Ph. A.* 40, 169) as follows:

"We note that he found it necessary, in order to extract the drugs used, to obtain as a minimum amount about four times the volume of percolate, that is to say, in extracting buchu, for example, four troy ounces of the drug required 17,625 fluidounces of percolate to exhaust it. In some cases the volume of percolate required, was more than six times the volume represented by the weight of the drug. For these experiments Mr. Army claims no rigid scientific exactitude—they were confined to practical operations in a retail pharmacy 'with all the care possible under existing disadvantages.'"

To this might be added the statement that in our gentian work reported below, the average drug is exhausted only after percolate amounting (in Cc.) to six times the amount of drug (in grammes) had passed, while in some extreme cases the ratio was one to eleven.

Testimony of previous investigators seems to agree with our conclusions that 100 Cc. of the repercolated fluidextract do not represent the activity of 100 grammes of drug.

Passing over Squibb's figures in *Proceedings A. Ph. A.* 13, 218, which shows work done before he had devised his process of repercolation; in the *Proceedings A. Ph. A.* 26, 722, he reports a repercolation of cinchona

in which 32 avoirdupois ounces of the drug containing 358.83 grammes extract yielded 32 avoirdupois ounces of fluidextract, containing 252.44 grammes of extract; only 70.3 per cent. of what its strength should have been.

Again (Proceedings A. Ph. A. 26, 731) he reports a repercolation of four batches of 8 troy ounces of cimicifuga containing 316.95 grammes extract with the result that the combined (four) reserve portions, approximately 30 fluidounces contained 253.89 grammes extract. Since, from figures just given, 30 troy ounces of the drug should contain 297 grammes extract, the 253.89 grammes extract in the 30 fluidounces of finished fluidextract, showed a marked deviation from 100 per cent. strength.

Diehl (A. Ph. A. 26, 685) states that the first 12 fluidounces of percolate from 16 troy ounces of drug in simple percolation, average about 60 per cent. of the extract in that 16 troy ounces of drug.

The repercolation work of Sayre and his associates, since based on 50 per cent. tinctures, does not offer exact comparison with work done by us, but it likewise emphasizes the difficulty of securing a 100 per cent. product on the original lines of repercolation.

EXPERIMENTAL PART.

During three winters, selected groups of students were allotted the manufacture of 200 Cc. of fluidextract of gentian by repercolation, all using the same stock of gentian (in 30 powder). At the same time from the same batch of gentian, a fluidextract of gentian was prepared by percolation with partial evaporation, care being taken to secure complete exhaustion of the drug. This "U. S. P. Fluidextract of Gentian" was taken as the norm; the amount of extract obtained by evaporation of 10 Cc. of this being compared with the amount of extract from 10 Cc. of the repercolated samples.

As each year a new batch of drug was employed, the results have to be grouped in three tables.

TABLE II. 1907-08.

Grammes of Extract from 10 Cc. Fluidextract.

		U. S. P. Fluidextract, 3.01 Gm. Repercolated Fluidextracts.	
Sample 1.....	2.38 Gm.	Sample 8.....	2.43 Gm.
" 2.....	2.45 "	" 9.....	2.18 "
" 3.....	1.91 "	" 10.....	2.56 "
" 4.....	2.65 "	" 11.....	2.46 "
" 5.....	2.35 "	" 12.....	2.19 "
" 6.....	2.71 "	" 13.....	2.78 "
" 7.....	2.93 "		

TABLE II. 1908-09.

Grammes Extract from 10 Cc. Fluidextract.

		U. S. P. Fluidextract 3.11 Gm. Repercolated Fluidextracts.	
Sample 1.....	2.47 Gm.	Sample 7.....	2.50 Gm.
" 2.....	2.21 "	" 8	1.60 "
" 3.....	2.90 "	" 9.....	3.07 "
" 4.....	2.30 "	" 10.....	3.03 "
" 5.....	2.54 "	" 11.....	2.75 "
" 6.....	2.82 "	" 12.....	2.23 "

TABLE III. 1905-10.

Grammes of Extract from 10 Cc. Fluidextract.

U. S. P. Fluidextract.—Sample 1 3.14 Gm.
 Sample 2 3.20 "

Repercolated Fluidextracts.

Sample 1.....	2.46 Gm.	Sample 10.....	1.99 "
" 2.....	2.34 "	" 11.....	2.51 "
" 3.....	2.51 "	" 12.. ..	2.27 "
" 4.....	1.80 "	" 13.....	2.76 "
" 5.....	1.95 "	" 14.....	2.15 "
" 6.....	2.00 "	" 15.....	2.41 "
" 7.....	2.63 "	" 16.....	2.34 "
" 8.....	2.08 "	" 17.....	2.18 "
" 9.....	2.24 "	" 18.....	2.44 "

50 Cc. Percolate From 100 Grammes Drug.

10 Cc. of this percolate yielded of dry extract.

Sample 1.....	yielded 3.0 grammes.	Sample 3.....	yielded 3.28 grammes.
" 2.....	" 3.41 "	" 4.....	" 3.05 "

Do not these figures show that while, as we already know, a 100 per cent. product cannot be obtained by simple percolation of a kilo of drug to a liter of percolate, a product stronger than 100 per cent. can be obtained by collecting the first 500 Cc. percolate from a kilo of drug?

Do they not suggest the advisability of consideration by the next Committee on Revision of a modified variety of "percolation with complete exhaustion" based on obtaining half as much percolate (in Cc.) as the amount of drug used (in grammes); comparison of the weight of extract obtained from 10 Cc. of this percolate with the weight of extract from 10 grammes of drug and final dilution of the (stronger) percolate to same strength as dry?

Such a plan would be much simpler than the present official process and would insure a full strength (100 per cent.) product. Whether it would be cheaper to throw away half the activity of the drug left in the marc than to waste the alcohol necessary to extract it; whether, in short, the plan should include a saving of weak percolate for future use, future experimentation will show.

In conclusion the writers wish to acknowledge the work of Miss Jessie G. Rosen in connection with the experiments of the first year.

Pharmaceutical Laboratory, Cleveland School of Pharmacy.

CONCLUSIONS.

From the above tables it is seen that in only three cases (No. 7 of Table I and Nos. 9 and 10 of Table II) did the re-percolated fluidextract approach in strength the fluidextract made by percolation with partial evaporation and whether this was due to some accidental manipulation on the part of the operator, or whether it can be taken as a sign of possibility of securing a genuine 100 per cent. product is an interesting question. The obvious conclusion, however, is that under the care exercised by the average manipulator, a 100 per cent. preparation is not obtained.

It emphasizes the need of some sort of standardization whether the operation is large or small; nor is this necessarily a tedious assay process;—a simple preliminary exhaustion of 10 grammes of the drug with the menstruum, evaporation of the percolate to a dry extract and weighing of same, constituting the needed standard of comparison, the only exception to this plan being with those fluidextracts containing glycerin.

Is it possible to obtain a 100 per cent. preparation from a drug by simple percolation?

Certainly: if one only stops the percolation at the right time.

During the past few weeks, a superficial investigation of the problem was made by entrusting to five specially competent seniors, batches of the same gentian used in Table III. Three of the men extracted batches of 50 grammes to 50 Cc. percolate, while the other two extracted 100 grammes to 50 Cc. percolate. The results are given below as Table IV.

TABLE IV.

10 grammes gentian used yielded 3.14 grammes extract.

50 Cc. Percolate from 50 Grammes Drug.

10 Cc. of this percolate yielded of dry extract.

Sample 1.....	yielded 1.15 grammes.
" 2.....	" 2.48 "
" 3.....	" 1.45 "

Mr. Sayre said he did not know of any subject more fruitful of an animated and prolonged debate than the one that had just been brought to the attention of the members. He was afraid from the rapidity with which the paper had been read that possibly some of the members did not understand the exact import of it. He supposed the author was aware of the fact that such a process as he suggested was already in vogue, and he thought Campbell was the originator of that process. He thought the Committee of Revision had already gone over this subject, and that

the main object of the Committee had been to produce as far as possible uniform preparations in the hands of the average druggist. Whether the average druggist had arrived at the point that the author assumed he had he did not know; but it was certainly very desirable that the subject should be again submitted to the Committee of Revision, and he was glad, indeed, to have the paper presented.

Mr. Scoville said he had made a little study of repercolation in his day, and he had come to the conclusion that there were three factors involved: First, the drug; second, the menstruum, and third, and most important, the operator. When drugs percolated easily, like capsicum and the resinous drugs in general, repercolation could be used with excellent results. Mr. Army had selected a drug which represented the average drug, and that was all right; but with some drugs this could not be done. As to the factor of menstruum, when some drugs were moistened with aqueous or weakly alcoholic menstrua they would swell up to twice the bulk they normally occupied; they would absorb their own weight or body; and certain drugs, when packed in a percolator, would absorb the menstruum, pint for pint, and one could not be sure that the percolate represented the drug, because the bulk was too much. On the other hand, if the menstruum was strongly alcoholic, the drug might shrink instead of swell; and yet there would be a better chance to get a concentrated percolate by a strong than a weak solution of alcohol. The third fact was the operator himself.

Mr. Scoville said he had found that the results were quite in proportion to the relative firmness with which the drug was packed. If it was packed firmly, quite a strong percolate would be the result, but if packed loosely it would give a weak percolate. He thought this was a problem for the Pharmacopœial Committee to deal with. The Pharmacopœia must have a uniform process, and must have a process as little dependent on the operator as possible. Repercolation would give good results with a good operator, and poor results with a bad one.

Mr. Remington said that the subject of percolation to the practical druggist was, at all times, a most interesting one. He had happened to be among Dr. Squibb's assistants when he brought out his process of repercolation. He was perfectly familiar with his experiments, which lasted over a year, and he thought it might be interesting to state a few facts in connection with this process. The process of repercolation was the result of Doctor Squibb's years of experience in developing a process that would save alcohol. That was the first proposition, to save alcohol, and make an economic process. Consequently, he realized the necessity of avoiding the use of heat—a very important consideration—because he realized that heat, as a rule, with most drugs, produced some dissociation of principles, and Mr. Remington said he thought all would admit that heat was undesirable in making fluidextracts. Right after the war, when alcohol was

very expensive—many plans were devised, by manufacturers particularly, for making fluidextracts that would save alcohol. Repercolation was picked up rapidly by the manufacturers. After Dr. Squibb published his process, Mr. Remington said he thought nearly every manufacturer in the country used repercolation in some form or other—and it was used to a large extent to-day. When it came to the study of drugs, and especially official drugs, this subject had to be viewed from a pharmaceutical standpoint, and a process had to be given which would be generally applicable to nearly every drug. He thought experimentation would show that 75 to 80 per cent. of the valuable constituents of a drug would be found in what was called the “reserve percolate,” and many manufacturers during the war considered it sufficient, and some do to-day, to take 1000 Gm. of drug and slowly percolate with the proper menstruum, and get 750 cubic centimeters of fluidextract and throw the exhausted drug away—because they believe that that would make a fluidextract.

Mr. Remington went on to say that the reason the pharmacopœial formula was constructed as it was was because it was intended to be used by retail pharmacists all over the United States—not manufacturers; and that Mr. Scoville and Mr. Army had struck a key-note when they stated that the process depended upon the skill and care of the operator. The character of the menstruum and the slowness of the percolation had a great deal to do with the complete exhaustion of the drug. If the drug was packed loosely in the percolator and the menstruum allowed to go through rapidly, instead of getting 75 per cent., a 40 per-cent. extractive only might be obtained. On the other hand, if it was percolated very slowly, very much better results would be had. Therefore, it would depend very largely on the personal equation of the operator.

Mr. Remington said that he wanted to say, in closing, that where it was realized that these formulas for fluidextracts were to be sent throughout the whole country, to be used by men of little or no experience in percolation—men who were ignorant—the Pharmacopœia had nothing else to do but, in base-ball vernacular, to “play safe”; that was, the setting apart of a reserve percolate representing 75 to 80 per cent. of the value of the drug without the use of heat. Then the operator should go on with the percolation and evaporate the least valuable portion of the percolate to a soft extract. Some drugs were not injured by a higher temperature, but with drugs which contained volatile or easily dissociated principles the heat would be objectionable.

And so they had to introduce a safe process, taking into consideration all these facts. Mr. Remington went on to say that he thought it would be a very dangerous thing to put in the Pharmacopœia directions to start with 1000 Gm. of a drug and percolate slowly, and get 750 cubic centimeters of reserve and throw the residue away. In the hands of the manufacturer, he would say that it might be all right, for they use many checks. The oper-

ator on a large scale must have had a great deal of experience, and he could be safely trusted : but for the retail druggist it would hardly be safe to put such a process before him.

Mr. Apple said he wanted to call attention to a fact about repercolation he had not heard mentioned here, and that was, that one must take into consideration in the process of repercolation the length of time elapsing since the last lot was made and the next lot repercolated. In discussing with physiological chemists the question of determination of standards, they admitted that these products would deteriorate almost as soon as manufactured, the rapidity of such deterioration depending upon the conditions under which the finished products were stored.

Mr. Hallberg said that the manufacturer on a large scale who reserved 75 per cent. of the volume of the percolate, of course, did not throw the remainder of weak percolate away. He preserved that and used it to moisten his drug. But the retail druggist could not do that. The objection to the process, the way the weak percolate had been concentrated by evaporation, was, that the evaporation caused a change in the alcoholic strength, and to that extent induced precipitation. This would be largely avoided by the modification of the process of the National Formulary. There was quite a difference in the processes of the N. F. and the U. S. P. When the weak percolate was concentrated to a solid extract and that was added to the reserve, which was already a saturated solution, at once a precipitation was induced, which could be prevented by addition of sufficient original menstruum to make it up to the required volume. After having once started precipitation, it could not be retarded. By the N. F. process there was no precipitation. Therefore, he advised that the process of the National Formulary should be the process of the Pharmacopœia for fluidextracts.

Mr. Hynson said he wanted to ask Mr. Arny what steps were taken to standardize these extracts, and said he would like to know if time was not a factor. He asked if a good deal of the varying effect of repercolation was not due, not to menstruum, but to time.

Mr. Arny said that his idea in presenting this paper was the hope that just this sort of discussion would come out. He had recited his own personal experiences, and he wanted to get those of others. But if it was considered by the members that this criticism of the pharmacopœial process was an unwise one he would unhesitatingly say that his paper should not be published. The point was this, that the U. S. P. process, according to his notion, was impracticable. He agreed that repercolation was an ideal process, but the question was, would it give 100 per cent. fluidextract. The manufacturer could obtain it, but he was talking about the retail pharmacist operating on a small scale. He said the third point he wanted to bring out was one which was not clearly understood. He wanted to make it clear that in the process of repercolation, working with small

batches of drug, say 100 grammes, instead of getting the activity of 100 grammes of drug in 100 cubic centimeters of the percolate, one operator might get the activity of 75 grammes and another of 50 grammes of the drug in 100 Cc. percolate. Mr. Arny said that in none of the literature that he had seen on repercolation was any scheme suggested for standardization. His scheme was, in brief, to first take 10 grammes of the drug, percolate it to exhaustion with the official menstruum and learn amount of drug extract by evaporation of the percolate. This learned, the proper amount of the drug (say 1000 grammes) was to be percolated with the official menstruum until the percolate measured half as many cubic centimeters (in above proportion 500 Cc.), as grammes of drug used. 10 Cc. of this percolate was to be evaporated and comparing yield with extract with that from 10 grammes of drug the percolate could then be diluted to conform to drug strength. He said, of course there were drawbacks in the plan. If the percolate contained glycerin, then of course, standardization by evaporation would not be feasible.

As far as speed was concerned, he said he carefully regulated the percolate to drop from three to five drops a minute. As to Mr. Scoville's proposition as to the individuality of the operator, Mr. Arny asked the question whether the average operator could really make a 100 per cent. fluidextract by repercolation.

Mr. Hallberg suggested as an answer to this question, that drugs which could not be assayed chemically should be tested physiologically.

Mr. Arny said that the gentleman misunderstood his point. His question was, could a fluidextract (by repercolation) be made by the retailer, operating in a small way, and was there any simple way for estimating the strength of the finished product?

The Chair stated that the next paper on the program was by Hiland Flowers, on Experimental Percolation, but the author was not present. He had sent, however, some samples for the inspection of the members, such as *strophanthus*, *nux vomica*, etc., and especially called attention to a sample of opium, made in a very few minutes by the process described. The Chair said he thought it would be wise to refer to the Scientific Section to find out whether there was anything in pressure percolation, as he understood in Germany it had been turned down. He said he would entertain a motion to refer these samples to the Scientific Section.

Mr. Hallberg said he thought all the papers on percolation had been read, and that the discussion was to be concentrated on all of them at once, and he would be sorry to see the time taken now to discuss this paper separately. He moved that it be received and read by title, and referred to the Publication Committee.

It was so ordered.

A paper by Paul J. Waldner, on "Criticisms of the U. S. P. Tinctures," was read by title and referred, in the absence of the author.

"Tincture of Cantharides" was the title of a paper next presented by the writer, Wilbur L. Scoville:

TINCTURE OF CANTHARIDES.

BY WILBUR L. SCOVILLE.

The U. S. Pharmacopœias of 1870, 1880 and 1890 directed tincture of cantharides to represent 5 Gm. of drug in 100 Cc. of tincture. In the Eighth Revision this strength was doubled to accord with the international standards for potent drug tinctures, viz., that such tinctures should represent 10 Gm. of drug in each 100 Cc.

Since several foreign pharmacopœias (French, German, Japanese, etc.) recognize a 10 per cent. tincture of cantharides, it was not thought necessary to prove the practicability of this change, and it was adopted without special investigation.

The assay of cantharides has never reached the stage of simplicity and accuracy that applies to alkaloidal assays. The processes for cantharides assay are mostly long and tedious, and the results are not thoroughly satisfactory. In 1907 Greenish and Self published in the *Pharmaceutical Journal* (Vol. 24, p. 324) a new process, which is a decided improvement on the older ones, but which requires considerable care and practice to yield reasonably concordant results. In describing their process they give considerable attention to the solubility of cantharidin in different solvents. In alcohol the solubility is variously reported as "very insoluble," "slightly soluble," "1 in 952," "1 in 3300," and "1 in 1330," by various observers.

Since the alcohol solubility of cantharidin is a vital point in tincture of cantharides, I first tested this in the following way: 0.2 Gm. of cantharidin, in fine crystals, were shaken during several days, in a mechanical shaker, with 100 Cc. of alcohol. The undissolved crystals were then collected, dried and found to weigh 0.125 Gm., leaving 0.075 Gm. dissolved by 100 Cc. of U. S. P. alcohol. This corresponds to a solubility of 1 in 1333 (w. v.) at a temperature of 23° to 25° C. and agrees closely with the reported solubility of "1 in 1330" (w. v.).

Cantharides is reported to contain from 0.5 per cent. to 1.0 per cent. of cantharidin, when of good quality, and 100 Gm. of such cantharides will contain 0.5 to 1.0 Gm. of cantharidin, requiring 660 to 1330 Cc. of U. S. P. alcohol for dissolving it. The question of what influence the other constituents of cantharides may have upon the solubility of cantharidin in an alcoholic solution then remains.

To determine this four samples of Russian cantharides were obtained, assayed by the process of Greenish and Self and tinctures prepared from them. Cantharidin is slowly soluble in most solvents and special care was exercised in making the tinctures. Percolation was conducted very slowly, the collecting of a liter of tincture, including the preliminary maceration, occupying from 8 to 17 days. The percolates were shaken each day, to

keep them well mixed and prevent supersaturation. When finished, each tincture was nearly clear, but on standing (1 to 5 months) each had deposited a small amount of whitish sediment of a granular character. After standing a few days, to permit any insoluble matter which might be present to settle, each was assayed. Following are the results :

U. S. P. Tinctures.

Drug No. 1.....	{ 0.58 per cent. 0.61 per cent.	cantharidin,	tincture { 0.038 per cent. 0.039 per cent.
“ “ 2.....	{ 0.68 per cent. 0.71 per cent.	“	“ { 0.038 per cent. 0.039 per cent.
“ “ 3.....	{ 0.73 per cent. 0.77 per cent.	“	“ { 0.032 per cent. 0.034 per cent.
“ “ 4.....	{ 0.71 per cent. 0.74 per cent.	“	“ { 0.020 per cent.

In each instance the tincture represents two-thirds to one-half, or less, of the total cantharidin in the drug used. The tincture from Drug No. 4 was made by more rapid percolation (8 days in process) than the others, and evidently is not a fair representative. But if this be eliminated, the results for the other tinctures are very disappointing.

Cantharidin is found in cantharides both free and combined, and in most assay processes a mineral acid is used to liberate the combined cantharidin.

Since the above tinctures do not in any case represent a saturated alcoholic solution of cantharidin, the question remains whether the unextracted cantharidin may be combined in the drug, or simply insoluble in the tincture.

Cantharidin was found to be soluble in 125 parts (w. v.) of glacial acetic acid, and a second series of tinctures was made, with an acidulated menstruum.

A tincture of No. 2 drug made with a mixture of 1 volume of glacial acetic acid and 15 volumes of alcohol showed 0.051 per cent. of cantharidin by assay. Three tinctures were then made of the three drugs, using a mixture of 10 volumes of glacial acetic acid and 90 volumes of alcohol as a menstruum. Following are the results :

Acidulated Tinctures.

No. 1, drug—{ 0.58 per cent. 0.71 per cent.	cantharidin, tincture—{ 0.061 per cent. 0.066 per cent.
No. 2, drug—{ 0.73 per cent. 0.77 per cent.	cantharidin, tincture—{ 0.052 per cent. 0.061 per cent.
No. 3, drug—{ 0.71 per cent. 0.74 per cent.	cantharidin, tincture—{ 0.061 per cent. 0.066 per cent.

These results are much more satisfactory than the U. S. P. tinctures, but are still a little below the expected strength. These tinctures have all remained bright, showing no trace of sediment.

Greenish and Self showed that cantharidin volatilizes with steam, and it is possible that a material loss occurs in the preliminary evaporation of the tinctures, though the temperature was not allowed to exceed 50° C. at any time. They also showed that there is some loss when solutions of cantharidin in benzene or in chloroform are evaporated, the amount of loss depending upon the rate of evaporation of the solvent, and the amount of heating. 200 mils. of tincture were evaporated to dryness for each assay, and it is reasonable to conclude that some loss may occur at this stage. Time does not permit of testing this point before this paper is due.

The results, however, warrant two conclusions: First, that the U. S. P. tincture does not represent 10 per cent. of a good drug, even when prepared with exceptional care. Second, that an acid menstruum is much better than a neutral one for the extraction of cantharides. Glacial acetic acid has the double advantage of being a good solvent for cantharidin, as well as freeing the combined cantharidin, but there is reason for thinking that the best effect of the acid is its liberation of the combined cantharidin. Furthermore, since combined cantharidin is inactive as an irritant, the acid menstruum may be expected to yield a more active as well as a stronger tincture.

Mr. Remington said that he thought tincture of cantharides was used by pharmacists chiefly in making hair preparations, as it has been known for many years that acetic acid was an excellent solvent for cantharidin. He thought in some pharmacopœias vinegar was designated for that purpose. He expressed the opinion that Mr. Scoville's paper would be received by the Committee and studied; but, after all, he did not think it would be satisfactory to introduce the acetic menstruum.

Mr. Seltzer, referring to Mr. Remington's suggestion that tincture of cantharides was used mainly for hair preparations, said he was surprised to see how often it had been dispensed in the last four or five years, that it was quite frequently used in prescriptions in his locality.

Mr. Hallberg expressed surprise that Mr. Scoville had experimented with an acid; he thought he should have used an alkali. He should have used caustic potash. Cantharidin was an acid, and formed a soluble salt with alkali. There would be no difficulty in complete exhaustion by the use of an alkaline menstruum.

Mr. Scoville replied that acetic acid was one of the best solvents for cantharidin—better than chloroform; yet he could not get an extract of cantharides with acetic acid that represented the drug, and the only way he could account for that was, that the extractive had an influence on the solubility.

He said he would like to ask Mr. Hallberg if he thought an alkaline tincture of cantharides would be an active preparation—a proper preparation of cantharides, to use as it was used. He himself did not think so, as he did not believe it would be active enough.

Mr. LaWall said that a great deal of work had been done by Mr. Beringer on this subject, as set out in a paper presented before the New Jersey Pharmaceutical Association some years ago, and that he had arrived at the same conclusion Mr. Scoville had. He said this paper of Mr. Beringer's had never been very widely copied, although it was published in the proceedings of the New Jersey Association.

A paper on "Abstracts from the Squibb Laboratory Note Books," was next presented by the author, Mr. Dunn:

ABSTRACTS FROM THE SQUIBB LABORATORY NOTE BOOKS.

JOHN A. DUNN.

These few notes are given as an addition to those read before the Section on Practical Pharmacy and Dispensing at the fifty-seventh annual meeting of the American Pharmaceutical Association held in Los Angeles, Cal., May 16-21, 1909.

DILUTED HYDROCYANIC ACID, ASSAY.

The weighing out of exactly 5 Gm. entails a certain loss of hydrocyanic acid. It is also desirable to avoid diluting to a given measure and taking a part of this diluted solution as required by the U. S. P., VIII. To prevent loss of hydrocyanic acid during weighing put 25 Cc. distilled water in an 8-oz. Erlenmeyer flask and add 5 Cc. $\frac{x}{y}$ KOH, V. S. Stopper the flask and weigh. Now add quickly from a pipette about 3 Cc. of the acid, stopper and weigh again, to get weight of sample. Add a little sodium chloride and then run in from a burette $\frac{x}{y}$ silver nitrate V. S. with frequent agitation until a permanent turbidity appears. This is best seen by titrating with the flask on some dark surface.

The number of Cc. of $\frac{x}{y}$ silver nitrate V. S. multiplied by 0.005368 and then by 100, and this figure divided by the weight of the sample, gives the per cent. of absolute hydrocyanic acid in the sample.

RESIN OF SCAMMONY.

For the past few years we have been quite unable to obtain in the home market or abroad any of the old-fashioned Virgin Scammony, and the question now arises, What are we going to do about it? Will the pharmacopœial authorities permit us to resort to the extraction of the root as the British Pharmacopœia directs or will we have to seek for it in other directions?

In connection with this matter we are told that the root of *Jalapa siformis* (*Ipomoea orizabensis*) and the so-called Tampico jalap (*Ipomoea simulans*) yield to alcohol a resin chemically identical with that obtained from the scammony root, and that much if not most of the "scammony" resin found in the market to-day is probably obtained from these sources. Following up this suggestion, we determined to make some experiments

along these lines, and as the result of our investigations we find the yield of resin from the various sources to be about as follows, using official alcohol as a menstruum for extraction :

From the so-called Mexican scammony (*Ipomoea orisabensis*)—

Dark root, about 13 per cent.

Light root, about 12 per cent.

From scammony root, about..... 8.4 per cent.

One and one-half times its weight of alcohol completely exhausted the true scammony root, while three times its weight was required for the Mexican roots.

The two resins differ greatly, not only in physical properties, but also in appearance and odor, as well as in their behavior toward the various solvents. The resin from the Mexican roots is lighter in color, and the odor is that of resin of jalap. The resin from the scammony root has the "scammony" odor and color.

FERRIC HYPOPHOSPHITE.

Test for Foreign Heavy Metals.

The U. S. P. test reads as follows : "If 1 Gm. of the salt be dissolved in about 25 Cc. of boiling water, by the aid of sufficient hydrochloric acid, added drop by drop, etc." We suggest that nitric acid be used at this point instead of hydrochloric acid for the following reason : When hydrochloric acid is used and the iron is later precipitated with a slight excess of ammonia water, the precipitate is greenish in color and it is difficult to filter from it a clear solution. When nitric acid is used the precipitate obtained is red-brown, the filtration is rapid and the filtrate clear and colorless.

DETANNATED TINCTURE OF CINCHONA.

Take

Ground cinchona No. 60 200 Gm.

Magnesia, calcined, light 34 Gm.

Ammonia water 300 Gm.

Diluted alcohol, q. s.

Directions.—Mix the ground cinchona with the calcined magnesia, then moisten with all of the ammonia water and allow the mixture to stand 24 hours, then remove to trays and dry thoroughly in a hot room and again reduce to about a 60 powder. Now macerate with sufficient diluted alcohol for six hours, then pack it firmly in a percolator and proceed as with the regular tincture cinchona U. S. P., using diluted alcohol throughout and adjusting to U. S. P. alkaloidal strength and making the final product just acid to litmus paper. This formula is offered for the reason that the formula of the National Formulary, III, will not work out a pro-

duct of full alkaloidal strength. In our experience, covering four trials, only one-quarter to one-third strength was obtained.

SOLUTION OF IRON OXYCHLORIDE.

Experience with this solution since our report to you at the last meeting suggests that solution of iron chloride be used instead of solution of iron tersulphate which we suggested at that time. The precipitated iron hydroxide from solution of iron chloride seems to be more readily soluble in the small quantity of hydrochloric acid than the one obtained from iron tersulphate solution.

ELIXIR OF IRON, QUININE AND STRYCHNINE PHOSPHATES.

This preparation when made by following the U. S. P. exactly gives a product which is brownish-green in color and soon becomes quite dark. We have found that this is due to the ammonium acetate and the exacting directions of the U. S. P. to have the finished preparation exactly neutral. When the ammonium acetate is reduced in quantity, leaving sufficient only to insure a permanent solution of the alkaloids, and the final directions to neutralize are omitted, a preparation is obtained which has a nice green color when finished and keeps a good color for a sufficiently long time, so that a pharmacist making a portion, say once a month, would not experience any trouble. The Pharmacopœia should state that this preparation darkens with age, and that its efficiency is not affected thereby. We suggest the following figures:

Use of ammonium carbonate.....	5.1 Gm. instead of 9 Gm.
Use of acetic acid	16 Gm. instead of 28.65 Gm.

Do not follow the U. S. P. directions, "and if the solution be acid to litmus paper, neutralize exactly with ammonia water."

Mr. Francis said there was an item in this report that attracted his attention, and that was with reference to the resin of scammony. He said there had been for the last year or more a great scarcity in the Oriental scammony root, and as a result the scammony as manufactured in the United States had been manufactured from the Mexican scammony. In fact, he had seen very few samples offered in the last six months that could be identified as coming from the Oriental root. He had seen the scammony offered from the Mexican article, which could be had very much cheaper. He thought there was very little evidence tending to prove that the Oriental scammony was better or worse than the Mexican drug, but he believed that he was correct in the statement that the Pharmacopœia did not permit the use of Mexican scammony.

Mr. Hallberg thought this question of scammony was an important one, and said that all who had to make compound cathartic pills and compound extract of colocynth knew that the price of scammony had been so high

the last few years as to almost prohibit the use of the drug. He asked if there was not some way to determine whether or not this extract of the drug from the root was equal to the resin from the virgin scammony.

Mr. Dunn said the experiments along this line were interrupted by a fire that had occurred in their establishment, but that the consensus of opinion of those who had joined in the experiments was, that it was an active resin. No accurate conclusions had been arrived at, however.

The Chair stated that the next paper on the program was one on some U. S. P. preparations, by John K. Thum, of Philadelphia. The author was not present, and the paper was simply received and referred for publication :

A paper on " Preservation of Volatile Oils," was presented by the author, Charles H. LaWall.

A NEW METHOD OF PRESERVING VOLATILE OILS.

BY CHARLES H. LAWALL.

In 1904, while the writer was engaged in examining a number of substances purchased from bakers' supply houses with the view of ascertaining whether they complied with the Pennsylvania State Food Law, a bottle marked "Oil of Lemon" was found upon examination to contain a mixture of equal parts of oil of lemon and cottonseed oil. The dealer was proceeded against in the course of time and the case being settled, the incident was temporarily forgotten. During the winter of 1906, when a number of specimens were overhauled with a view to discarding the more ancient of them, this bottle was found and upon observing the odor the writer was surprised to find that it had not become in the least terebinthinate, but had a fresh and agreeable odor, notwithstanding the fact that two years had elapsed and the oil had been kept in a partially-filled bottle in a closet in the warmest part of the laboratory. Mention of the fact was made in a lecture to the junior class in pharmacy in the institution with which the writer is connected, and one of the students, Mr. Cecil Beam, of Moundsville, W. Va., offered to take the subject up for his thesis. He accordingly made a number of experiments upon oil of lemon, using varying quantities of fixed oil and exposing the samples to different conditions of temperature. At the time of Mr. Beam's graduation in 1908, when his thesis was handed in, it was accompanied by his samples which were more than a year old then and which conclusively showed the effectiveness of even so small an amount as 1 per cent. of fixed oil in completely retarding the acquiring of a terebinthinate odor. Mr. Beam's samples have been again examined recently (1910) and they are still in a perfectly fresh condition as regards odor, while his unpreserved samples submitted at the same time are in a badly decomposed state.

In the spring of 1909 the writer made some additional experiments upon several other oils in order to try out the method still further. Speci-

mens of the oil of orange, lavender flowers and peppermint were selected as being especially prone to deteriorate. They were mixed with varying proportions of fixed oil, using olive oil instead of cottonseed oil, as being of a more bland and permanent character (olive oil had also been used by Mr. Beam in his experiments), and while the samples of the pure oils have undergone marked changes for the worse, the samples containing the fixed oil are all in an excellent state of preservation.

I would therefore conclude that the addition of a small proportion of fixed oil (5 or 10 per cent.) to an easily decomposable volatile oil would be a satisfactory method of retarding deterioration. It must be remembered that an oil thus preserved could not be sold as a pure oil and that when used in manufacturing due allowance must be made for the diluting material, which, being insoluble in alcohol, readily separates and can be filtered out of a preparation

Mr. Eliel said that, in his experience, he had found that when fresh packages of oils, like oil of orange and other oils belonging to the citrus family, were opened and only part of same used, if diluted with an equal amount of alcohol, there was no difficulty in keeping the residue—the alcohol being taken out, of course, when the oil came to be used. So far as oil of peppermint was concerned, if the oil was U. S. P. to start with, he did not believe it would be necessary to add anything to preserve it, except to take proper care of it and store it in a cool, dark place, with a fairly even temperature. The U. S. P. directed that the oil be a redistilled oil, and as all the resins were removed in the process of redistillation, he thought possibly there would be no change if the oil was right at the start. He said he had been told by distillers of oil that a good quality of oil improved by age. He did not know how true this was, never having tried it out, but so far as the citrus oils were concerned, he thought the alcohol method was by far the preferable method for preservation.

Mr. Eberhart asked Mr. LaWall whether the addition of any fixed oil had this effect, as well as olive oil. Mr. LaWall replied that he was unable to answer, because he did not make any experiments, except those mentioned.

Mr. Wharton, of Alabama, said he had put the oil in small ounce containers and sealed it up, and put it in a cool, dark place, and he had been very successful with it.

The Chair stated that he had had the same experience as Mr. Eliel, only he had found the alcohol used must be absolute alcohol. He had made an experiment with oil of sweet orange, and had opened a bottle very recently, a bottle three years old, after receiving Mr. LaWall's paper.

Mr. Eliel said that, in his reference to alcohol, he took it for granted that it would be understood he referred to absolute alcohol; that he did not use a hydro-alcohol as a diluent.

The Chair next called for a paper on "Solution of Mercury Biniodide," by H. A. B. Dunning, of Baltimore. The writer presented his subject as follows :

SOLUTION OF MERCURY BINIODIDE IN OIL.

BY H. A. B. DUNNING.

Some years ago when the hypodermic injection of preparations of mercury and mercury compounds came into vogue for the treatment of syphilis and syphilitic disorders, various soluble salts of mercury in aqueous solution, suspensions of metallic mercury, and various insoluble salts of mercury suspended in fluid-oily combination were being used for subcutaneous injection, I conceived the idea that an oily solution of some mercury salt would be the ideal preparation for the purpose.

In my search for an oil-soluble mercury salt, the only satisfactory one which I found is the red mercuric iodide. In the literature consulted, I found a statement that this salt is soluble in fixed oils, which led me to experiment with solutions of the same in the following fixed oils : olive oil, oil of sweet almonds, cotton seed oil, oil of sesamum, castor oil, and also with petroleum oil.

Of the fixed oils mentioned, excepting castor oil, oil of sesame retained the larger percentage, 0.4 per cent., of mercuric iodide in solution, and seemed to have the most satisfactory characteristics for the purpose.

Castor oil, which will take up and retain more than 1 per cent. of mercuric iodide, is regarded as having too great viscosity to be satisfactory. While petroleum oils will take up the salt by heat, but little is retained in solution on cooling.

Some physicians in Baltimore have used a 0.4 per cent. filtered and sterilized solution of mercuric iodide in sesame oil over a period of four or five years, and are doing the same at the present time. Anæsthesine in small quantities (by some physicians) was deemed desirable to combat the pain of treatment.

Recently, at the instigation of a physician desiring a preparation of greater strength, I have prepared a solution containing 1 per cent. of the mercury salt in a mixture of olive oil two-thirds and castor oil one-third. According to the reports, this preparation has proven quite satisfactory, with the exception of the pain accompanying the injection, no worse, however, than is observed when injecting any of the preparations of like character. The addition of any local anæsthetic is perhaps inadvisable, because of the prolonged use and danger of habit-forming.

The following formulas are those to which I have referred in this paper :

R	Mercury biniodide	0.2 Gm.
	Anæsthesine	0.1 Gm.
	Oil of sesame	50.0 Gm.

Triturate the finely-powdered solids with a small portion of oil of sesame to a smooth paste, then add the remainder of oil and mix thoroughly, introduce into suitable container, and heat in water, shaking frequently until solution has been effected, filter while hot, pour into a glass-stoppered bottle, then sterilize by immersing in water and heating to boiling for one hour.

R	Mercury biniodide	0.50 Gm.
	Castor oil	18. Cc.
	Olive oil	32. Cc.

Triturate mercury biniodide to fine powder, and rub to smooth paste with a portion of mixed oils, and then add remainder of oils, introduce into a suitable container, and heat in hot water with frequent agitation until solution has been effected, filter while hot, and pour into glass-stoppered bottle, which is now sterilized by immersing into water and heating to boiling for one hour.

After several weeks' standing the product of this latter formula shows, sometimes, deterioration, to the extent that some of the mercuric iodide crystallizes out. I have recently prepared a sample of same strength in equal parts of castor oil and olive oil for observation, which will in all probability remain permanently a solution.

Mr. Asher said he was somewhat interested in this paper; that he had heard olive oil was used, and upon analysis they had failed to find mercury, and the conclusion reached was, that, in the process of making, the mercury had decomposed in some manner. He asked Mr. Dunning whether the solution contained mercury iodide as represented in the original formula. He said that in the journal of the American Medical Association he had seen where samples of this preparation had been analyzed in their laboratory, and they had failed to find anything but a trace of mercury. He wanted to know whether any further work had been done in this connection, other than as stated in the paper.

Mr. Dunning said that he was in a position to say that it had been tested out physiologically, as Mr. Hallberg suggested for testing these things. He thought he could say, without exaggeration, that his firm had made for the physicians in Baltimore a hundred pints of this solution, without any complaint as regarded the expected mercuric reaction or otherwise. He had not taken the trouble to test it chemically, since he had really felt that there was no occasion for such estimation.

Mr. Asher said the reason he had asked the question was, that in one of the chemical laboratories of his city they had this preparation to pass on by analysis, and the chemist, a personal friend of his, said he was unable to find mercury in a preparation on the market claimed to contain one per cent. of mercury.

Mr. Hallberg suggested that this formula be referred to the Committee

on National Formulary, as he thought this preparation was one that ought to be in that work. This motion was seconded by Mr. Army.

The Chair suggested that this formula had originated in France, and that the work Mr. Dunning had done upon it was to be commended.

Mr. Dunning was inclined to take issue with the Chairman upon this proposition, and said he was at work on this preparation about the same time that the French preparation was put forth.

Mr. Alpers asked if any of the members had any experience with solution of mercury salicylate—whether anyone had attempted this solution in oil. Physicians in New York City wanted to use it in hypodermic work.

Mr. Dunning said before the solution in oil was in use, they had put up large quantities of mercury salicylate in petroleum oil, in sterilized mixture, and it was frequently ordered as solution of mercuric salicylate and oil. This was carelessness on the physician's part, of course.

Mr. Seltzer said that mercuric salicylate in oil is not quite clear. They had used a water bath, and did not have much trouble, and although not a clear solution, they had dispensed it in that way.

The Chair suggested that this might be called an emulsion. Regarding the aqueous solution, he said he had used that occasionally, but it could only be made of a certain percentage.

Thereupon, the motion to receive Mr. Dunning's paper and refer to the Committee on National Formulary was put and carried.

Mr. Apple read the following paper :

IS THE U. S. P. STANDARD FOR PEPSIN SATISFACTORY TO THE
PRACTICAL PHARMACIST?

BY FRANKLIN M. APPLE.

This query undoubtedly will appear to be uncalled for by a number of those of our calling—due to their acceptance of the present standard as the highest one possible, or owing to their absolute indifference to the subject.

The standard of this animal product is presumed to represent the results of careful investigations along the line of proteolytic ferments, and when the purity rubric of the Pharmacopœia demands, generally, that chemicals shall be 97 to 99 per cent. pure (for 99 per cent. standards are very frequently noticed in the U. S. P. requirement), the operators in pharmaceutical processes, in the retail pharmacies, accept without a murmur and most complacently the difficulties encountered as unavoidable ones, when working with U. S. P. pepsin.

To my mind the standard for any chemical or product recognized by the U. S. P. should be such as to meet the most exacting requirements of the manipulators in pharmaceutical laboratories, and be as free from undesirable adherent or adulterating matter as possible, and this is especially desirable when the foreign matter is of animal origin.

When employing pepsin in the laboratory to prepare such preparations as solution of iron peptonate and manganese, or glycerite of pepsin, should we not have at our command the very best and purest pepsin that science can produce?

Almost everyone is familiar with the very harsh criticisms hurled at the liq. ferri. peptonati cum mangano, N. F., owing to the undesirable odor of the same, which has rendered it absolutely worthless as a remedial agent, although the proprietary preparations of the medicinal agent are largely prescribed by the medical men. In the revised formula for this preparation recommended by Mrs. Harrison, fresh albumen is utilized as the source of the peptone, being acted upon by pepsin, hence the purity of the latter should be as high as it is possible to make it.

In experiments covering a number of years, I have invariably found that a 1 : 6000 pepsin (practically a double strength one) has simplified very materially operations in which pepsin was employed, and we never use the official strength pepsin, except upon prescriptions for powders, when the bulk must be given in order to avoid suspicion and controversy.

In the U. S. P. (eighth revision) will be found the following statement: "If it is desired to use a diluent for reducing pepsin of a higher digestive power to that required by the Pharmacopœia, sugar of milk should be employed for this purpose." This appears to me in the light of a joker, when the high standard required for the zinc salts, for example, are considered in comparison, and when the literature of pharmaceutical houses that prepare pepsin and its preparations is carefully searched, for, at as remote a date as 1900, it is acknowledged by one manufacturing house that it was then "offering pepsin of any desired strength from 1 : 1000 to 1 : 15000 at a relatively uniform cost (so much per thousand) of digestive power."

If a 1 : 15000 pepsin cost just as much per thousand digestive power as a 1 : 1000 one, why should the pharmaceutical manipulator be led to use a 1 : 3000 product when the purer products are available at no additional costs, relatively?

It is acknowledged that, usually, it is the impurities in chemicals that cause the majority of the obscure pharmaceutical problems, hence why should the pharmaceutical manufacturers be content with a product with a low purity rubric when far better ones can be procured at no relatively greater cost?

With such high-test products available it is possible to meet the standard of the U. S. P. (VIII), to reinforce a very low-grade, undesirable product with a high-test one, so as to pass the requirements. This should not be tolerated in the next revision of the Pharmacopœia, as it should stand for the best obtainable only, thus giving laboratory workers better crude materials with which to manufacture superior products.

It may not be generally known that the standard for crude pepsin when it was first prepared was 1 : 10 to 1 : 12, which would not permit of very

elegant pharmaceutical products being made from them, and the standard was gradually improved until it reached 1 : 3000, where it has been anchored for some time ; but the time has come to abandon this obsolete standard for a much higher one.

If in preparing glycerite of pepsin, N. F., which is recognized as one of the best (if not the best) liquid form of pepsin, a high standard pepsin be employed, the process will be greatly simplified, and the product will be freer from undesirable foreign matter, making it a preparation that will appeal to the most exacting practitioners.

I will digress just a trifle and call your attention to the following statement appearing in the U. S. Disp. (19th edition) relative to the dosage and therapeutic value of pepsin, U. S. P. (VIII): "The usual dose of pepsin is from ten to fifteen grains, and it is plain that the solvent power of less than such an amount is too trifling to be of any value in sustaining the digestion of an adult . . . that it has been given to adults in ridiculously small doses, and that a drachm (3.9 Gm.) of the ordinary commercial article is a moderate dose."

To administer 60-grain doses of a powder, when it is possible to get the same therapeutic effect from a small bulk of a higher quality medication is to step backwards from the day of alkaloids and concentrated galenicals to the days of crude drugs and impure chemicals, and no progressive pharmacist or therapist will endorse such an act.

In order to make it possible for the practical pharmacist to prepare concentrated pharmaceutical products, the standard for the crude materials must be raised to the highest practical basis, and I feel positive that it is not making an unreasonable demand when I suggest that the standard for pepsin in the next issue of the U. S. P. *shall not be less than 1 : 6000*.

Give to the practical pharmacists of our country such crude materials that they can prepare creditable products such as will compare most favorably in every respect with the preparations sent out by large manufacturing establishments, in which they realize the importance of using only the purest and most concentrated crude materials.

The accusation has been repeatedly made that the U. S. P. (VIII) is a manufacturer's handbook and does not meet the needs of the rank and file of retail pharmacists and therapists: hence every effort should be put forth in the forthcoming revision to prevent a recurrence of the accusations, and one way to do so is to make the standard for crude drugs of vegetable, mineral or animal origin as high as moderate cost will permit.

To my mind the present low standard for pepsin is due more to oversight or lack of interest in this product than to any other cause; but I sincerely hope that the next standard of purity will be such that practical retail pharmacists will have at their command, as the official product, a far more satisfactory one for manufacturing purposes, with which they can prepare more elegant preparations, with less trouble and annoyance. Give

the great army of practical pharmacists a better opportunity to manufacture a greater percentage of their galenicals than at any time heretofore—thereby benefiting the greatest number of interested parties.

The Chair invited discussion upon this paper, but none was offered.

The next paper called for was one on "Syrup on Wild Cherry," which was presented as follows by the writer, Mr. Dunning :

SYRUP OF WILD CHERRY.

BY H. A. B. DUNNING.

Syrup of wild cherry prepared in accordance with the formula appearing in the Pharmacopœia, 1890 revision, produces a preparation essentially superior to the product obtained if 1900 revision formula be used.

I make use of the term essentially in this connection because I believe syrup of wild cherry should be regarded as a very desirable vehicle or solvent for certain drugs and chemicals to allay coughing and that therapeutically the syrup is of little value.

As a vehicle the 1890 preparation is superior because, due to the different mode of preparation, it is a beautiful wine-red solution, while in strong contrast the 1900 preparation is a sickly reddish-brown tinged with yellow. Furthermore, the 1890 preparation is more highly flavored, both as to odor and taste. It keeps quite as well as the 1900 preparation, and may be criticised only as regards the greater percentage of extractive matter, particularly of tannin character held in solution. It seems to me that there can be no great objection to the presence of tannin in the syrup because it is rarely used in combination with anything which is incompatible with it.

I therefore most earnestly suggest to the Pharmacopœia committee that they consider the advisability in the next revision of substituting the 1890 formula for the 1900 without change, except perhaps that the moistened wild cherry be macerated the required time loosely packed in a suitable percolator in which it is subsequently packed without removal.

Mr. Hallberg moved to accept the paper, and stated that the formula that the author referred to as being in the Pharmacopœia of 1890, he had put there.

The Chair stated that it was a good formula.

Continuing, Mr. Hallberg said he did not originate it, but he had prepared it from a formula of John W. Reeder, a graduate at the Philadelphia College of Pharmacy in 1876, this being his thesis, the extraction of wild cherry bark with water and glycerin. This would give a better extraction. It made a nicer preparation, and a better therapeutic preparation, and he considered that it was a "piece of vandalism" to take it out in the last revision. So far as he knew, no pharmacist would use the present process a second time. He proposed that there be added to the suggestion in the last paragraph of the paper as to macerating the required time, the clause—"and protect it from all contact with metals."

The following papers on the program were, in the absence of the writers, read by title and referred for publication :

Modification of Syrup of Ferrous Iodide—Wm. J. Toplis, Philadelphia, Pa. Terpin Hydrate—A Perfect Solution and a Satisfactory Preparation—Frank W. A. Hain, Newark, N. J. Elixir of Iron, Quinine and Strychnine Phosphates—Adolph F. Marquier, Newark, N. J. Permanent Compound Solution Sodium Phosphate—W. H. Glover, Lawrence, Kan. Random Notes—Thomas D. McElhenie, Brooklyn, N. Y. The Dispenser—J. Winchell Forbes, Rossmoynne, Ohio. Professional Pharmacy—J. Leon Lascoff, New York, N. Y.

The Chair stated that the next item was a paper on the subject of "Kerosene in Pharmacy," by W. R. White, Associate on the Committee.

Mr. White presented his paper as follows :

KEROSENE IN PHARMACY.

BY WILLIAM R. WHITE, NASHVILLE, TENN.

Kerosene, aside from its use as a heating and illuminating agent, has so far as I know never received any recognition as a therapeutic agent, although it has been employed as a domestic or household remedy for various ailments for some time.

In the last few years however, it seems to have been gaining a place in pharmacy and may in the future become a valuable and popular remedial agent.

Kerosene was formerly obtained by the dry distillation of coal and other bituminous substances and for this reason was called coal oil, but since the discovery of petroleum the name has been applied almost exclusively to the illuminating oils obtained from this source, which have been refined by distillation between 150° C. and 220° C. By consulting numerous authorities I find that the following names are often used as synonyms for kerosene : coal oil, rock oil, solar oil, paraffin oil, mineral oil, carbon oil, oil petre, earth oil, photogene, eupione and refined petroleum. Chemically, kerosene is a mixture of hydrocarbons belonging chiefly to the paraffin series.

It has a specific gravity ranging from .744 to .829, boils above 77° C. and has a flashing point from 62° C. to 68° C.

Kerosene mixes well with chloroform, ether, turpentine, the volatile oils and most of the fixed oils, but will not mix well with castor oil, glycerin or alcohol. It will dissolve 4 or 5 per cent. iodine if warmed and agitated, the solution resembling very much a commercial preparation and will take up a much larger per cent. if mixed with chloroform.

The disagreeable taste and odor of kerosene has always been a drawback to its use in pharmacy. The bad taste can be greatly modified by sweetening it with a small percentage of saccharin. To deodorize it however is a more difficult task.

I have experimented considerably with this object in view and find that most any volatile oil such as cassia, cajuput, cloves, peppermint, winter-green, camphor, bitter almond, or mirbane, will disguise its odor. I also tried to deodorize it by shaking it with acid solutions of such oxidizing agents as potassium permanganate, potassium dichromate and potassium chlorate, and then decanting and filtering it through freshly slacked lime; but none of these entirely deodorized it, although they improved it a great deal. Potassium chlorate gave the best results of the three. Kerosene with an alcoholic solution of potassium hydrate turns the alcoholic solution red and almost completely deodorizes the kerosene.

By the liberation of nascent hydrogen in kerosene I got an odor resembling that of onions. On investigating the effects of kerosene when taken internally I learned that if free from sulphur and the lighter hydrocarbons that it produces no bad effect. Blyth on Poisons reports a case where a woman drank a pint of it with suicidal intent and recovered; a slight pain in the stomach and a little febrile disturbance being the only bad effects.

I have known it to be taken internally in numerous cases of croup in children in from one-half to teaspoonful doses with good results. It is also taken frequently for coughs and colds, usually mixed with sugar. One man in my State has ascribed to it laxative properties. Dr. Granville S. Hanes, Professor of Rectal and Intestinal Surgery in the University of Louisville, Ky., has experimented with kerosene extensively as a rectal injection for amebic dysentery with excellent results. He uses a half-gallon or more at a time.

He says, "I have employed the ordinary coal oil for more than two years in the treatment of amebic dysentery; I have used it in more than 200 cases—not more than 50 however, affected with amebic dysentery—and in no case have there been any injurious effects from its use. It is decidedly the best agent I have ever used for the local treatment of amebic dysentery. Patients will receive much larger quantities of coal oil than they will of any aqueous solution, and will retain it a greater length of time."

The most important use of kerosene as a therapeutic agent has been in its application externally as a liniment, both alone and in combination with other agents, for rheumatism, lumbago, neuralgia, etc. I herewith submit a formula of a liniment containing 72 per cent. kerosene which may also be used internally for cramp, colic, etc.

Camphora.....	1. Gm.
Ol. Menthae Piperitæ.....	.5 Cc.
Ol. Gaultheriæ.....	.5 "
Ol. Caryophylli.....	2. "
Ol. Cassiæ.....	4. "
Ol. Gossypii.....	8. "
Ol. Cajuputi.....	8. "
Ol. Terebinthinæ.....	4. "
Kerosene.....	72. "
Mix and filter.	

Oil of cloves, oil of cassia, and carbolic oil dissolved in kerosene makes a splendid toothache remedy. Kerosene has already gained a rank as one of the best insecticides.⁵ Its use for this purpose has been tested in connection with the war on the mosquito during the last yellow-fever outbreak. Evelyn Groesbeeck Mitchell in "Mosquito Life" says an ounce of it sprayed over 15 square feet, kills not only larvæ and pupæ but catches the adults and is therefore by virtue of its simplicity, cheapness and efficiency the best larvacide for many purposes where its odor is not offensive. Kerosene does not harm fish or aquatic insects that do not breathe at the surface, and acts well in salt water. An emulsion of kerosene can be cheaply made by the following formula :

Soft Soap	2. Gm.
Boiling Water	32. Cc.
Kerosene.	64. "

Dissolve the soap in boiling water and add to kerosene and agitate vigorously. This is a snow-white emulsion which shows little tendency to separate. It can be used to spray trees, etc., when diluted with water. By adding *Ol. camphor*, *Ol. cajuput*, etc., it makes a splendid liniment also. Kerosene also enjoys some reputation as a remedy for the disease known as limberneck in young chickens. I have known of its use as a hair tonic, but have never tried it for that purpose yet.

The paper was passed for publication.

The Chair remarked in this connection that crude petroleum had always been used as a medicinal agent for man and beast—that even the old Seneca Indians used it and advised it. He went on to relate a bit of history, showing how the petroleum industry of to-day was the result of a lucky accident, in its discovery in a salt-well and its subsequent exploitation as a patent medicine. He described how through this discovery drilling for oil first started up, and remarked that the position of John D. Rockefeller, in the oil world to-day was due to the enterprise of a retail druggist.

A paper entitled "Pharmaceutical Notes," by Chas. H. Ware was read by title and referred for publication.

Mr. Eliel said he wanted to refer to Compound Solution of Sodium Phosphate, U. S. P. Everybody knew that the U. S. P. formula did not work out. A mould grew on it in a few weeks after making, and most of the sodium phosphate went out. This was one of the most difficult to be obtained on the market in buying from the manufacturers. Instead of using citric acid, if phosphoric acid were used, a permanent preparation could be made. With phosphoric acid, however, no difficulty would be found. The formula called for a certain quantity of sodium nitrate. He could see no reason for retaining the sodium nitrate, and he omitted it in his solution, and made large quantities of it, and his physi-

cians liked it and prescribed it—in fact, specialized that particular preparation. It was simply put in to combat a certain proprietary preparation on the market at the time. He said he certainly would like to have this matter referred by this Association to the Committee on Revision of the U. S. P. He thought it would be a good subject to take up, the question of substituting phosphoric acid for citric acid, and the leaving-out of sodium nitrate. He made an elegant preparation in this way.

The Chair stated that the next paper on the list was one by Mr. Berger, of Florida, on "Cuban Practical Pharmacy and Dispensing."

Mr. Berger presented his subject as follows :

CUBAN PRACTICAL PHARMACY AND DISPENSING.

BY E. BERGER, TAMPA, FLA.

The recent translation of the U. S. Pharmacopœia by Dr. Guillermo Diaz, professor of pharmacy in the University of Havana, and its adoption by the Cuban government, has met with a very favorable reception, which the sales of the book indicate.

Pharmaceutical progress on the island has been slow, due to Spanish colonial misrule and oppression, and the U. S. Pharmacopœia is the first bright light on their horizon for the progress of pharmacy. Although the Cuban has not made much progress, he nevertheless is a thorough pharmacist and learned in his profession. His business is conducted on ethical lines. Prescriptions are filled, and nothing but drugs, chemicals, pharmaceutical preparations, and but very few patents are found in his store. His professional standing is on a par with that of the physician. On coming to this country he, however, is quick to adapt himself to conditions, and extends his business even into more extensive lines of sundries and notions than we do. However, he has never successfully handled one important branch; this is soda water. To educate the Cuban public to drinking soda has proven a failure. Their soft drinks are very limited and are called "refrescos." They are mixtures of fresh fruit pulp, sugar, cracked ice and plain water, and are sold in their cafés.

The Cuban apprentice starts, as we used to, by washing bottles, scrubbing mortars and sweeping the store, in other words, from the ground up; and my experience with Cuban applicants before the Florida Board of Pharmacy indicates that they are better prepared and have a better fundamental knowledge than our American applicants. Neatness, cleanliness, and a full realization of the importance of their work are cardinal principles with them. The number of successful Cuban applicants before our Board is very much greater than that of Americans. This shows up particularly well when we take into consideration that they have studied the Spanish pharmacopœia and Spanish text-books only; neither does the physician nor the druggist in Cuba study Latin, and most of our examiners take the position that they can make no allowance for this, and that the Cuban

must answer the same questions which the American applicant does. We attempted to refuse these men (very few speak English) our examination except in the English language. However, we reconsidered our decision, and they can take the examination as heretofore through the aid of an interpreter.

A very small percentage of the Cubans and Spaniards in this country, especially where they live together in separate parts or suburbs of a city, learn English. They have their own commercial establishments of all kinds, and their own physician who seldom speaks English, and of necessity require a druggist who can administer to their wants.

The Cuban druggist manufactures nearly all of his pharmaceuticals, and some chemicals and essential oils, although since American intervention several of our large pharmaceutical houses are doing considerable business on the Island. On moving to our country, they follow suit in this particular, as well as in our business methods, and patronize the pharmaceutical houses liberally.

Prescriptions are written in Spanish with the possible exception of the time honored R, although many Cuban physicians use the letter F, being a contraction for Formula. The following is a characteristic prescription :

R	Riaz de Ipecacuana contundida	veinte centigramos
	Agua	sententa y cinco gramos
	Infundase.	Despues de enfriamiento filtrase y anadase :
	Ioduro de sodio	veinte y cinco centigramos
	Carbonato de Ammonio	dos gramos
	Jarabe simple	veinte y cinco gramos
	Dis. y. m.	

Cucharaditas
Una cada dos horas

Sept. 6— 1909

Dr. — —

Translated.

R	Ipecac Root, Bruised	.20
	Water	75.
	Make an infusion.	After it has cooled, filter and add :
	Sodium Iodide	.25
	Ammonium Carbonate	2.
	Simple Syrup	25.
	Dissolve and mix	

Teaspoonfuls
One every two hours

Sept. 6th, 1909

Dr. — —

Counter prescribing is not an issue in Cuba due to the high professional standing of the pharmacist and his consequent close and friendly relations with the physician.

With the translation and adoption of our Pharmacopœia and the constantly growing trade relations with Cuba it is but natural that our methods of practice will be gradually adopted. Our Association in my opinion

could do a great work of mutual benefit by increasing its membership among Cuban druggists on the island, and if possible, instituting a branch there.

Mr. Hynson moved that the paper take the usual course, but that the Secretary call attention of the Council to the suggestion in the paper in regard to increasing the membership in Cuba. He thought that matter might be taken up with considerable success, and with benefit to this Association and to Cuban pharmacy. He suggested that Mr. Berger be sent over there to form a local branch, as he could talk Spanish.

The Chair so put the motion, that the paper be received to take the usual course, and that the attention of the Council be called to this matter, and the motion prevailed.

The following papers were read by title and referred for publication:

Elixir Digestivum Compositum, N. F., by Henry Blair, Philadelphia. Pepsin and Pepsin Preparations, by C. F. Nixon. Practical Suggestions for N. F. Preparations, by W. J. Koch. Grays' Glycerin Compound, original formula, by Henry Utech. Spiritus Aetheris Nitrosi, by E. R. Cook and C. A. Duncan.

The Chair stated that Mr. Eberle wanted to say a few words about the last paper presented.

Mr. Eberle said that the addition of glycerin was taken into consideration as a preservative. This was made use of in the British Pharmacopœia, and it had been found that glycerin does preserve the preparation for a longer time than alcohol alone. But the improvement was in the use of two alkalies at one time thereby saving loss of ethyl nitrite. This particular preparation was tested on two occasions, about two months apart, and the last time it was only very slightly deficient. The main point was, however, the use of the two alkalies at one and the same time thus avoiding loss of the ethyl nitrite incident to the usual manipulation.

The Chair stated that this concluded the program of the session, of some thirty-five papers, and it was only a quarter past six. He called for nomination of officers of the Section as the final order of business.

Mr. Hynson said he was interested in the Association, and he feared that nominations made at this time would not be altogether judicious, and he hoped the Section would entertain a motion to name a nominating committee, composed of the Ex-Chairman, Mr. Apple, and Messrs. Dunning and Seltzer, this committee to make report at the next session.

Mr. Wilbert thought this suggestion was out of order, as in conflict with the By-laws, but the Chair suggested that no harm could be done by it, and if any one desired to bring in other nominations later, it could be done.

Thereupon the Chair put the vote upon Mr. Hynson's motion, and it prevailed.

Upon motion of Mr. Hynson, the Section then adjourned.

SECOND SESSION—FRIDAY EVENING, MAY 7, 1910.

Chairman Raubenheimer called the Section to order at 8.30 p. m., and asked Associate White to preside, while the Chairman read his Introduction to the Symposium of the Pharmacopœias of the World, arranged for this session.

Mr. Raubenheimer presented his subject as follows ;

SYMPOSIUM ON THE PHARMACOPŒIAS OF THE WORLD.

My first thought was that such a symposium should be held in the Scientific Section. But after due consideration and as the result of correspondence with prominent members of the Association I reached the conclusion that it should be held before the Section on Practical Pharmacy and Dispensing. My aim is to make this an international reunion of the various pharmacopœias, and I consider it unique in this respect that the retail pharmacists, scientific pharmacists, pharmaceutical editors, professors, teachers, literary pharmacists, physicians, government officials and also manufacturing pharmacists have been selected from different parts of the country to take part in this symposium. In fact, I even went beyond the boundaries of the United States, as, upon the advice of Professor Remington, I asked one of our foreign members, Prof. T. Ladakis, of the Syrian Protestant College at Beirut, to review the Pharmacopœia of Greece. Professor Ladakis was good enough to inform me that no official pharmacopœia was to be found in Greece, and that the only pharmacopœia recognized by the Greek government was one published in the year 1837, which was based on the Bavarian Pharmacopœia at that time.

According to such an authority as Schelenz, *Geschichte der Pharmazie*, page 680, the Munich pharmacist, Xaver Landerer, who went with King Otto I to Athens, became the reorganizer of Greek pharmacy, and, together with John Bauros and Joseph Sartorius, published the first edition of the Greek Pharmacopœia, which was followed by a second edition in 1868. Professor Ladakis also wrote me that the Greek Pharmacopœia was official for some years, but had ceased of late to be an official book, and that the French Codex and the German Pharmacopœia are used unofficially. The German Pharmacopœia was even translated into Greek in 1893.

A Greek Pharmacopœia was to have been published some time ago, but its issuance was deferred for the time being in the belief that an International Pharmacopœia would be published to take the place of the different National Pharmacopœias. The pharmacopœia used at present in Greece is a book edited in 1899 by Prof. A. K. Dambergis, of the University of Athens, and it is recommended to the students of medicine and pharmacy by the National Council of Greece. This Dispensatory does not give any official requirements, but is a compilation of the preparations of the German, French, British and other Pharmacopœias. I have noticed lately in

foreign pharmaceutical journals that a new edition of this Dispensatory has been issued. The "American Druggist" of April 25, 1910, contains an excellent review of Professor Dambergis' manual.

The pharmacopœias to be reviewed in this symposium are those of Austria, Belgium, France, Germany, Great Britain, Hungary, Italy, Japan, Mexico, the Netherlands, Russia, Scandinavia—i. e., Denmark, Norway and Sweden; Spain, Spanish America—i. e., Chili, Venezuela and Argentine; Switzerland and the United States, a total of twenty. As may be seen, the scope of this symposium is a large one, and I am in hopes that even a little knowledge of these various pharmacopœias will be helpful to the members of the A. Ph. A. as well as the U. S. P. Revision Committee. The Pharmacopœial Convention of the coming week has certainly stirred up the medical as well as the pharmaceutical profession, including the wholesaler, the retailer and the manufacturing pharmacist. It is indeed a pleasure for me to state that numerous pharmaceutical associations have elected as their delegates to the convention practical retail pharmacists, men who know the conditions in retail pharmacy thoroughly, men who will attend the convention and who will present suggestions and recommendations. I would also remind you at this point that the Congrès International de Pharmacie is to be held at Brussels, September 1 to 5, 1910. Every pharmacist who loves his profession ought to join this Congress, as the fee for active membership is only twenty francs. The Congress has issued among the eight propounded questions the following: "The utility and necessity of a large number of practical pharmacists on the committees charged with the revision of the pharmacopœias and the establishment of an International Pharmacopœia." Let us hope that in the next Pharmacopœial Revision Committee practical pharmacy will be represented by practical pharmacists and members of the A. Ph. A., especially on the sub-committees on galenicals. In all civilized countries they calculate with the same figures, they measure with the same instruments, they study along the same lines, and they practically employ the same drugs, chemicals and galenical preparations for the relief and cure of disease. But there have existed in the pharmacy of the different nations vast differences, and the several people have clung tenaciously to their respective standards. You will fully realize the wide range in such a daily-used preparation as Syrup of Ferrous Iodide when I tell you that in former years it contained: 0.5 per cent. FeI_2 , Belgium and France; 1 per cent., Mexico and Switzerland; 10 per cent., United States, Denmark, Sweden; 12.2 per cent., Hungary.

The often-used Dover's Powder, which in most pharmacopœias contains 10 per cent. of powdered opium, formerly ranged from 8.8 per cent., Spain; 14.3 per cent., Austria and Italy; 16 per cent., Belgium.

And how dangerous these various preparations might be can well be illustrated by the tincture of *strophanthus*, which although of 10 per cent.

strength in most pharmacopœias, is 2.5 per cent. in Great Britain, and was 5 per cent. in the United States and 20 per cent. in France and Mexico.

Tincture of aconite is 5 per cent. in Great Britain; 10 per cent. in most pharmacopœias and was 20 per cent. in France and Hungary, and was 35 per cent. in United States. Perhaps the best illustration of all showing the variations in the strength of official preparations is diluted hydrocyanic acid which, although of 2 per cent HCN. strength in most pharmacopœias, did contain 1 per cent. in Japan, Mexico and France; 2.5 per cent. in Belgium, and even 10 per cent. in Spain and Portugal.

It was due to this difference in strength that in 1895 the late Dr. Bruno Hirsch compiled his excellent book, "*Die Verschiedenheiten gleichnamiger officineller Arzneimittel*," giving the variations in official medicaments with the same name.

At the Paris International Pharmaceutical Congress in 1900, Prof. Alexander Tschirch, of Berne, who, I am very glad to state, has been elected an honorary member of the A. Ph. A. at the Richmond Meeting made the following proposition: "To have a comparative table prepared showing the difference in strength of medicines having the same name in different pharmacopœias; to have this table distributed to pharmacopœial commissions, academies of medicine, pharmaceutical colleges, etc., with the request to take the matter into due consideration at their next pharmacopœial revision and to adopt, as far as possible, a uniform standard of strength, and when differences still remain, to call attention to such in a footnote." This brought about the International Conference for the Unification of Formulas of Potent Medicaments at Brussels, September 15 and 20, 1902, and at which the United States was so ably represented by Dr. Fred B. Power and Dr. Horatio C. Wood. Every pharmacist ought to be acquainted with the resolutions of this International Conference, or, as it is shortly called, Brussels Protocol, as it has been published in the pharmaceutical press, also in Hager's *Ergänzungsband*, and in Bulletin No. 49 of the Hygienic Laboratory of the Public Health and Marine Hospital Service September 20, 1902, and November 29, 1906, the days on which this agreement was signed will be memorable ones in the annals of pharmacy as they mark the advent of a new era, the fruition of attempts covering nearly fifty years. All the different nations, with the exception of Germany, Great Britain and Russia, which will follow shortly, have since 1904 published new editions of their pharmacopœias, books which, as Professor Tschirch so well said, are the mirrors of their times.

When I proposed this symposium it was stated that not many retail pharmacists were acquainted with any of the foreign pharmacopœias. I am glad to state the contrary. For the benefit of those not acquainted with these books, copies are here for inspection and for the benefit of the dispensing pharmacists in general. I beg to remind them that

in a Canadian or British prescription a pint means twenty fluidounces, and that in Continental prescriptions liquids are not measured, but are always weighed. Most Continental prescriptions are written in Latin, with the exception of a few, as f. i., the French, Spanish and Italian, which are written in the language of the respective countries. The strengths of the various galenicals, especially of the potent preparations, have been made uniform, according to the Brussels Protocol, and no further change will be required. It must also be borne in mind that Continental alcohol instead of being 95 per cent. strong is only 90 per cent., and diluted alcohol 68 to 70 per cent. In the foreign pharmacopœias the strengths of the acids also differ considerably. Acidum aceticum means glacial acetic acid. Acidum aceticum dilutum must not be confounded with our 6 per-cent. acid, as it ranges from 20 to 50 per cent. in strength. The U. S. P. acidum aceticum dilutum of 6 per cent. strength corresponds to the acetum of the foreign pharmacopœias. In connection with this, permit me to suggest that the excellent Report on the Progress of Pharmacy in our Proceedings by Professor Diehl could be still further improved if the strength of the articles which differ materially from the U. S. P. standards could be stated, as is done for instance, in Dietrich's Manual. I do not mean to put any extra work upon our hard-working reporter, but I do know that only a very small minority of our members would take into consideration the strength of the article when following a formula quoted from a foreign pharmaceutical journal. The odor and especially the color of a great many galenicals also differ largely from the U. S. P. preparations. Good examples of this type are Fowler's Solution, which is colorless in most of the foreign pharmacopœias; tincture of nux vomica, being prepared directly from the seed, has a yellowish color. The foreign pharmacopœial nomenclature also differs widely from our own, and this is well worth remembering in compounding foreign prescriptions. Essence de canelle on a French prescription does not mean essence of canella, but oil of cassia cinnamon. Tinct. strychni or strychnos is not tincture or solution of strychnine, but our tinct. nucis vomicæ. Ammoniacum is the official Latin title in the Spanish Pharmacopœia for ammonia water of 10 per cent. strength and must not be confounded with gum ammoniac. Natrium chloratum is not, as ordinarily supposed, sodium *chlorate*, but sodium *chloride*, NaCl.

Precipitè blanc can be taken for our white precipitate (ammoniated mercury), and also for precipitated calomel. I cite these few examples to show that in order to compound foreign prescriptions correctly and to prepare foreign galenicals the pharmacist must be well acquainted with the foreign pharmacopœias.

In summing up I beg to call your attention to the fact that the high position which the pharmacy of the United States occupies at present in International pharmacy can only be kept up if we adopt the progress of the other nations. The United States, England, Germany and Austria

certainly lead in practical pharmacy, France and Switzerland being more productive scientifically, than practically or technically. It is a well known fact that the chemical and, to some extent, also the botanical part of the U. S. P. VIII is far superior to any of the foreign pharmacopœias. The galenical part, however, decidedly needs improvement. The review of these foreign pharmacopœias in this symposium will impress us with the short precise directions for manipulations in the preparations of their galenicals. The explicit directions and unnecessary repetitions in our present U. S. P. could be well dismissed and given a place in the Dispensatories or Commentaries. We will also be impressed with the physical description of galenicals in the foreign pharmacopœias which should be adopted in the coming U. S. P. revision and serve as a guide to the practical dispensing pharmacist. Simplification should be practiced more extensively in the coming U. S. P. revision. Maximum single and daily doses are certainly an improvement over the average doses. The adoption of a distinctive sign, as an exclamation point (!) in case the maximum dose is exceeded in a prescription, would serve as a safeguard to both pharmacist and physician.

In conclusion I beg to thank the members who have so willingly offered themselves to take part in this symposium which I trust will be remembered for a long time to come, and also let me hope that such a symposium will be held in the Section on Practical Pharmacy and Dispensing in advance of *every* U. S. P. Convention. There is no doubt in my mind that the symposium will again prove what I have said on previous occasions, that the U. S. P. is peerless among the pharmacopœias of the world or, as such an authority as the German pharmaceutical historian, Hermann Schelenz has so well expressed, "The U. S. P. is without doubt the aristocrat of all the pharmacopœias."

On motion of Mr. Ladish, the paper was accepted, to take the usual course.

Mr. Raubenheimer resumed the chair.

The Chair called on Mr. Wilbert to read a paper on "International Standards" and Mr. Wilbert presented his subject as follows :

INTERNATIONAL STANDARDS.

THE RELATIVE COMPLIANCE OF VARIOUS PHARMACOPŒIAS WITH THE PROTOCOL OF THE BRUSSELS CONFERENCE.

BY M. I. WILBERT.

It is quite probable that for far-reaching effect no effort to establish greater uniformity in the strength of pharmaceutical preparations has been as successful or has met with such really widespread acceptance as the protocol adopted by the "International Conference for the Unification of the Formulæ of Potent Medicaments," held at Brussels, September 15-20, 1902.

Among the unexpected results it is gratifying to be able to point out that the provisions of this protocol have been practically adopted *in toto* by a majority of the nations represented, and also by at least several of the countries that were not represented at the Conference and therefore not bound by the resulting treaty signed at Brussels, November 29, 1906, by the diplomatic representatives of the several powers.

It is particularly gratifying to learn that the importance of establishing universal standards for potent medicaments was early recognized, and at least a year before the provisions of the Brussels Protocol were embodied in the pharmacopœia of any one of the signatory governments they were included, almost entire, in the Pharmacopœia of Mexico.

It would be altogether superfluous to review, at this time, the various steps which led up to the meeting of the International Conference, in Brussels, in 1902, as they are described at some length in a series of articles by the late Frederick Hoffman (*Amer. Journ. Pharm.*, 1901, v. 73, pp. 315, 373, 431), while the report by Dr. Frederick B. Power, one of the delegates of the U. S. Government (*Ibid.*, 1903, v. 75, pp. 1-13) gives the additional information necessary to bring the review down to the time of the convening of the Brussels Conference, and also includes a translation of the protocol as finally adopted.

As noted above, this protocol forms the basis of an Agreement between the United States and other Powers respecting the Unification of the Pharmacopœial Formulas for Potent Drugs, signed at Brussels, November 29, 1906, and this agreement is available in the form of a publication issued by the U. S. Department of State as "Treaty Series No. 510."

In connection with the "Digest of Comments on the Pharmacopœia of the United States of America (Eighth Decennial Revision) and the National Formulary (Third Edition)," now being compiled in the Hygienic Laboratory of the U. S. Public Health and Marine-Hospital Service, an attempt is being made to reflect accurately the degree of compliance in the several available national pharmacopœias with the provisions of the Brussels Conference Protocol. Such of our members as are interested in the more complete data are referred to the above publications.

For the present occasion an attempt has been made to illustrate, in a practical way, the changes that have been brought about during the short period of less than 5 years since the first national pharmacopœia issued for, or by any one of the signatory powers was published in 1905.

The conditions existing at the time of the convening of the Brussels Conference are fairly well reflected by Table I, while the now existing conditions are shown by Table II.

TABLE I.
Showing Preparations Official in various National Pharmacopœies in 1902 compared with Proposed International Standards.

	Ph. Brit. IV, 1898.	Ph. Germ. IV, 1900. and Suppl., 1895.	Ph. Mex. III, 1894.	U. S. P. VII, 1893.	Ph. Hip. VI, 1884.	Ph. Nal. III, 1889.	Ph. Japon. II, 1891.	Ph. Belg. II, 1885.	Ph. Austr. VII, 1889.	Ph. Dan. VI, 1893.	Ph. Helv. III, 1893.	Ph. Svec. VIII, 1879.	Ph. Fr. IV, 1884.	Ph. Ital. II, 1901.	Ph. Hung. II, 1888.	Prot. Internat.
Tincture of aconite	5 w/v	10	.....	35 w/v	.....	10	.....	.....	.....	10	.....	.....	20	10	20	10
Tincture of belladonna	6 w/v	.....	20	15 w/v	20	10	.....	.....	20	10	.....	.....	20	.....	.....	10
Tincture of cantharides	1.25 w/v	10	.....	5 w/v	.....	10	10	20	10	10	10	10	10	10	20	10
Tincture of colchicum seed	20 w/v	10	20	15 w/v	.....	10	10	20	.....	.....	.....	10	20	.....	20	10
Tincture of digitalis	12.5 w/v	10	.....	15 w/v	20	10	10	20	20	10	10	10	20	10	20	10
Tincture of hyoscyamus	10 w/v	10	20	15 w/v	20	10	.....	20	.....	.....	.....	.....	20	.....	.....	10
Tincture of iodine	2.5 w/v	10	8.4	7 w/v	19	8	8.4	.....	6	.....	8	5	7	8	.....	10
Tincture of ipecac .....	.....	10	20	.....	20	10	.....	20	.....	10	10	10	20	.....	20	10
Tincture of lobelia	20 w/v	10	20	20 w/v	.....	10	10	20	.....	10	10	10	20	10	.....	10
Tincture of nux vomica	16.6 w/v	10	20	12 w/v	20	10	10	20	10	10	10	10	20	10	.....	10
Tincture of opium	7.5 w/v	10	12.5	13 w/v	.....	10	10	8.4	10	10	10	10	15	10	.....	10
Tincture of opium, Sydenham's .....	.....	10	12.5	.....	8	.....	.....	13.5	10	.....	10	.....	.....	.....	10	10
Tincture of opium, camphorated	0.46 w/v	0.5	0.6	0.5 w/v	.....	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.45	.....	.....	0.5
Tincture of strophanthus	2.5 w/v	10	20	5 w/v	.....	5	.....	.....	5	.....	.....	.....	.....	10	10	10
Bitter almond water .....	.....	0.1	.....	0	0.83	0.1	0.1	0.05	0.1	0.1	0.1	1.3	0.5	0.1	0.1	0.1
Syrup of ipecac .....	.....	1	1 ex.	7 w/v	2	5	.....	.....	.....	1	1	.....	3	1	1	1
Syrup of iron iodide	7.3 w/v	5	1	10	0.67	5	5	0.5	5.5	10	1	10	0.5	0.61	12.2	5
Hydrocyanic acid, dilute	2	2	1	2	10	2	1	2.5	.....	.....	.....	.....	1	.....	.....	2
Onitment of mercury	48.5	33	50	48.5	50	25	33	50	30	20	34	20	50	50	30	30
Solution of potassium arsenite	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Wine of antimony	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.4	.....	0.4	0.4	.....	0.4	0.4	0.4
Powder of ipecac and opium	10	10	10	13	8.8	10	10	16	14.3	10	10	10	10	14.3	10	10

TABLE II.
Showing Comparative Degree of Compliance with International Standards, by the Several Pharmacopœias, in 1910.

	Ph. Brit. IV, 1898.	Ph. Germ. IV, 1900.	Ph. Mex. IV, 1904.	U. S. P. VIII, 1905.	Ph. Hisp. VII, 1905.	Ph. Japon III, 1905.	Ph. Belg. III, 1906.	Ph. Austr. VIII, 1906.	Ph. Dan. VII, 1907.	Ph. Helv. IV, 1907.	Ph. Svec. IX, 1908.	Ph. Fr. V, 1908.	Ph. Ital. III, 1909.	Ph. Hung. III, 1909.	Prot. Internat.
Tincture of aconite	5	10	10	10 w/v	10	10	10	10	...	...	10	10	10	10	10
Tincture of belladonna .....	...	...	10	10 w/v	10	10	...	10	...	10	10	10	10	10	10
Tincture of cantharides	1.25 w/v	10	...	10 w/v	10	10	10	10	...	10	10	10	10	10	10
Tincture of colchicum seed	20	10	10	10 w/v	10	10	10	10	10	10	10	10	10	10	10
Tincture of digitalis	12.5 w/v	10	10	10 w/v	10	10	10	10	10	10	10	10	10	10	10
Tincture of hyoscyamus	10 w/v	...	10	10 w/v	10	10	10	10	10	10	10	10	10	6	10
Tincture of iodine	2.5 w/v	10	...	7 w/v	...	10	8.5	10	10	10	...	10	...	...	10
Tincture of ipecac .....	...	...	10	...	10	10	10	10	10	10	10	10	10	10	10
Tincture of lobelia	16.6 w/v	10	...	10 w/v	10	10	10	10	10	10	10	10	10	10	10
Tincture of nux vomica	12.5 w/v	10	10	10 w/v	10	10	10	10	10	10	10	10	10	10	10
Tincture of opium	7.5 w/v	10	10	12 w/v	10	10	10	10	10	10	...	10	10	10	10
Tincture of opium, Sydenham's	5 w/v	10	10	...	10	10	10	10	10	10	10	10	10	10	10
Tincture of opium, camphorated	0.45 w/v	0.5	0.5	0.48 w/v	...	0.5	0.5	0.5	0.5	0.5	0.5	0.5	...	...	0.5
Tincture of straphanthus	2.5 w/v	10	0.1	10 w/v	10	10	10	10 w/v	10	10	10	10	10	10	10
Bitter almond water	0	0.1	0.1	0.002 w/v	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Syrup of ipecac	2	1	...	7 w/v	1	1	1	1	1	1	1	1 ex.	1	1	1
Syrup of iron iodide	10	5	1	5	5	5	5	5	5	5	5	...	...	5	5
Hydrocyanic acid, dilute	2	...	1	2	2	2	2	2	...	...	...	...	2	...	2
Ointment of mercury	48+	33	30	50	30	30	30	30	30	30	30	50	30	30	30
Solution of potassium arsenite	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Wine of antimony	0.457	0.4	0.3	0.4	0.4	0.4	0.4	0.4	...	0.4	0.4	...	0.4	0.4	0.4
Powder of ipecac and opium	10	10	10	12	10	10	10	10	10	10	10	10	10	10	10

The Brussels Conference Protocol includes a total of 42 titles, of which 11 are simple substances and 31 galenical preparations. In the above tables an attempt has been made to present the former and the present drug strength of 22 of the more important of these preparations in accordance with a table originally compiled for the American Journal of Pharmacy (1903, v. 73, pp. 13-27; See also Proc. Am. Pharm. Ass., 1903, p. 571).

The tables are based on the minimum, permissible, active principle content of the drug or resulting preparation, wherever this is specified in the International Protocol. For this reason no cognizance is taken of the fact that many European Pharmacopœias direct that tincture of opium be made by dissolving an assayed extract of opium in the required menstruum. It also explains the reason why the U. S. P. opium preparations are given as representing 12 per cent. in place of 10 per cent. of the drug.

The general status is perhaps even more graphically presented in Table III; showing the total number of drug-strength compliances, in the several pharmacopœias enumerated, with the requirements of the International Protocol, in 1902 and in 1910.

TABLE III.

Showing Total Number of Compliances and Non-Compliances with the Requirements of the International Protocol.

Pharmacopœias.	1902.			1910.		
	Complied.	Did not Comply.	Total.	Complied.	Did not Comply.	Total.
Ph. Brit.	3	17	20	..	..	..
Ph. Germ.	17	1	18	17	1	18
Ph. Mex.	2	16	18	15	3	18
U. S. P.	4	16	20	15	5	20
Ph. Ndl.	17	4	21	21	1	22
Ph. Hisp.	1	14	15	20	0	20
Ph. Japon.	11	3	14	17	1	18
Ph. Belg.	2	17	19	22	0	22
Ph. Austr.	13	5	18	18	0	18
Ph. Dan.	9	3	12	14	0	14
Ph. Helv.	17	3	20	20	0	20
Ph. Svec.	12	4	16	15	0	15
Ph. Fr.	3	17	20	17	2	19
Ph. Ital.	10	5	15	19	0	19
Ph. Hung.	8	6	14	16	2	18
Total	129	131	260	246	15	261

Attention should be directed, specifically, to the fact that the appended

tables illustrate only the approximate compliance in the drug strength of the several preparations. In this one particular our U. S. P. agrees fairly well with the international requirements aside from the use of the English practice of measuring in place of the continental practice of weighing the resulting liquid preparation.

Apart from this rudimentary requirement of per cent. of drug strength, however, the U. S. P. VIII differs more widely from the actual requirements of the Brussels Conference Protocol than any one of the other national pharmacopœias. In the light of what has actually been accomplished, it appears to have been unfortunate indeed that pharmacists in this, the most cosmopolitan, and in many respects the most advanced, country of the world, were not sufficiently alive to the possibilities that presented themselves in this connection, to insist that the proposed international standards be adopted in their entirety seven years ago when the present revision of our pharmacopœia was in press.

It is probable that no one feature of the U. S. P. VIII has been more severely criticised abroad than the failure to comply more fully with the provisions of the Brussels Protocol, and our failure to live up to these requirements has no doubt influenced at least some of the committees or commissions revising the pharmacopœias of other countries and prevented a more complete compliance on their part. Thus it has been pointed out by Greenish and others that of the first national pharmacopœias to be published after the signing of the Protocol at Brussels, in 1902, the Spanish Pharmacopœia leads by conforming to 96 per cent. of the requirements; the Belgium Pharmacopœia conforms to 87 per cent., the Dutch Pharmacopœia 81 per cent., the Austrian Pharmacopœia 77 per cent., and the Pharmacopœia of the United States to but 27 per cent. of these requirements. To arrive at these results Belgium was compelled to modify 80 per cent. of the formulas, Spain 75 per cent., Holland 39 per cent., and Austria but 6 per cent. of the corresponding formulæ contained in the previous editions. Henry G. Greenish (*Pharm. Jour.*, June, 1907, p. 832) in further discussing the same question makes the following comment: "The conspicuous failure on the part of the United States to bring its formulas into harmony with those of the agreement, as shown by the table, and also the notes on the various preparations, is the more remarkable when considered in conjunction with the statement in the preface (of the U. S. P.) that 'the recommendations of this (the International) Conference have been adopted by the Committee of Revision except in one or two instances.'"

The more evident variations are in the nomenclature of the official substances, the strength of menstruum, and the general non-compliance with articles 2 and 3 of the Protocol. The variation in nomenclature is perhaps the most unfortunate shortcoming, for it is generally acknowledged that multiplicity of names or multiplicity of applications for the same

name must lead to confusion, and confusion is and ever has been a bar to progress.

In a paper on the then newly-proposed international standard tinctures of potent remedies (*Am. J. Pharm.*, 1903, v. 75, pp. 20-27) I ventured the opinion that: The advantage that must be admitted in favor of the proposed international standard menstruum is that it would be uniform in strength for all extractive tinctures of potent drugs; that the keeping qualities of the preparations would be improved; that a smaller proportion of the inert materials would be extracted, and that therefore less precipitation would take place.

The opinions expressed at that time have been amply verified in practice. With the single exception of tincture of ipecac, international standard tinctures made more than seven years ago are still clear and evidently satisfactory, while corresponding preparations made with the U. S. P. VII menstruum of diluted alcohol generally precipitated heavily within a few years at most.

One perhaps important feature in this connection is that approximately 70 per cent. alcohol has long been recognized as being a much more efficient antiseptic than either more dilute or more concentrated mixtures of alcohol with water. This one property of 70 per cent. alcohol alone should warrant its careful consideration on the part of the next U. S. P. Committee of Revision for adoption as a routine menstruum in place of the diluted alcohol now generally prescribed.

For the sake of international uniformity this strength of alcohol should certainly be used in connection with tinctures of potent drugs when specified in the Protocol of the Brussels Conference.

The provisions of articles 2 and 3 of this protocol are also well worth endorsing in their entirety.

The provision that no extractive preparation of a potent drug be directed to be prepared in the form of a medicinal wine is a reasonable one, in view of the variation in alcohol strength of and material held in solution by wines of different origin.

The adoption of a normal drop measure can now hardly be objected to in view of the general acceptance of this provision in the pharmacopœias of foreign countries.

Altogether it would appear that in view of the widespread and general acceptance of the provisions of the "International Agreement respecting the Unification of the Pharmacopœial Formulas for Potent Drugs" by the powers signatory to the treaty of 1906, the Pharmacopœia of the United States of America should surely be made to comply with the letter as well as with the spirit of that agreement.

It would also appear desirable that in future we should endeavor to lead in matters relating to the establishment of greater uniformity in the standards for widely used drug products and thus evidence our desire or

at least willingness to take an active part in promoting the sciences relating to the preparation and the use of drugs for the prevention and cure of diseases.

The Chair said this was very valuable work that Mr. Wilbert had done, and was right along his line—that he liked to do it, and he hoped it would be appreciated. He invited discussion upon the paper, but none was offered.

The next item upon the program was the Austrian Pharmacopœia. This was verbally reviewed at some length by the Chairman himself, who asked Associate White to preside for the time being.

The Chair invited discussion.

Mr. Wilbert exhibited the German translation of the Austrian Pharmacopœia to the members, and referred to the limitation for age of drugs contained therein. This he said was a common feature of European Pharmacopœias. He spoke of *Rhamnus purshiana* being several years old prior to coming to Austria, and also commented upon the fact that aconite did not appear in the Austrian Pharmacopœia, as an illustration of the old saying that a prophet is not without honor save in his own country. Aconite, he said, was introduced into medicine in Austria in the eighteenth century, and was introduced from there into other countries, and yet aconite had entirely disappeared from the Austrian Pharmacopœia. Another interesting feature of the Austrian Pharmacopœia was the use of the name acetphenetidin for phenacetin.

Mr. Raubenheimer, in regard to *Rhamnus purshiana*, stated it might be true that it was a year old before it came to Austria, but he thought the U. S. P. made it two years old.

Mr. Day suggested that it was one year in the U. S. P.

Mr. Hallberg said that the manufacturers usually let it lie about four years.

On motion of Mr. Ladish, the paper was received and ordered to take the usual course.

Mr. Raubenheimer resumed the chair, and called for the reading of a paper on the Belgian Pharmacopœia, by Mr. Motter. The author had to return to Washington City, he said, and he asked Mr. Wilbert to read the paper.

PHARMACOPŒIA BELGICA III.

BY MURRAY GALT MOTTER, WASHINGTON, D. C.

In response to our Chairman's invitation, I have undertaken a brief review of the current edition of the Belgian Pharmacopœia, which will consist of a very free paraphrasing of its preface, together with certain observations based upon comments encountered in our compilation of the data for the bulletins issued by the Hygienic Laboratory.

The third edition of the "Pharmacopœia Belgica" was issued from

Brussels in 1906. To the preceding edition, published in 1885, there were added two supplements, the one in 1892 and the other in 1895. The third edition is printed both in Latin and in French. The work of revision was, by a royal decree dated October 13, 1897, assigned to a commission consisting of two physicians and five pharmacists (two of them inspectors), with Mm. Nélis and Ranwez, both of them pharmacists, designated as president and secretary, respectively. As a preliminary to the work of the Commission, the government sought the opinions of provincial medical commissions with reference to the modifications to be introduced into the pharmacopœia; while, in the course of its work, the Commission communicated its provisional results to the medical and pharmaceutical societies, inviting comment thereon. It is interesting to note, in this connection, that the statistics furnished by the inspection service of the country had long since demonstrated the need of further and more precise definition of analytical methods and processes.

In the matter of admissions and eliminations, practical usage and real utility were adopted as the guiding principles.

For simple drugs, the precise designation of the botanical species and part of the plant used, while for powders, tinctures, extracts and certain other products, the assay processes furnish data sufficient to establish the quality of the drug.

In the case of balsams, gum-resins, essences, oils, fats, waxes, etc. assays are prescribed which provide for the detection of the more common adulterants.

With reference to galenicals, which it is assumed that the pharmacist himself is able to prepare, certain quantitative determinations are prescribed; an ash content for powders, a dry residue for tinctures and fluidextracts and, wherever practicable, the active principle content.

Especially in the case of the natural drugs which constitute the "heroic medicaments," such as opium, nux vomica, belladonna leaves, etc., where, owing to the very variable content of active principles it is otherwise impossible to secure preparations of uniform strength, the pharmacopœia prescribes well-defined assay processes for these active substances, which are to be isolated and standardized. It was, of course, to be expected that the Belgian pharmacopœia would show a close adherence to the decisions of the Brussels Conference for the Unification of Heroic Medicaments.

A number of fluidextracts were adopted for the extemporaneous preparation of certain medicaments. In the matter of simple vehicles and excipients considerable latitude is allowed; thus, no particular wine is specified, but any wine conforming to certain general qualities is permitted. The same general principle is followed in the preparation of medicinal oils, capsules, perles, etc.

Chemical medicaments are, with rare exception, the products furnished

by commerce, but "purity rubrics" have been notably developed. Assay processes are given with considerable attention to detail, as to conditions of operation and quantities entering into reaction. For the calculation of solutions and analytical determinations, atomic weights are given in round numbers.

This pharmacopœia includes certain formulas for veterinary preparations, with the view that all such medicaments should respond to the same tests, as to purity and strength, as in the case of medicines intended for mankind.

Save where there is special indication to the contrary, certain general rules are to be observed :

Natural drugs (organs and plants) are to be employed in the dry state.

All quantities indicated by the term "parts" are parts by weight.

Temperature indications refer to the Centigrade thermometer.

Pharmaceutic operations are undertaken at ordinary temperatures, in neighborhood of 15° C.

Analytic determinations, unless otherwise specifically mentioned, are to be made at 15° C.

The water employed is always distilled water, conforming to the title *Aqua*, for which the synonym is *Aqua destillata*.

The concentration of solutions is indicated by the relation between the weight of the substance dissolved and that of the solution obtained. For example, the aqueous solution of potassium bromide 1:10 is prepared by dissolving 1 Gm. of potassium bromide in 9 Gm. of water, which yields a total of 10 Gm. of solution.

When a solution is mentioned without indication as to the solvent, an aqueous solution is meant.

In the assay of medicaments, the name of a reagent designates the product described in the list of reagents.

When, in any preparation, the pharmacopœia prescribes a minimum of a particular principle, this prescription is to be taken in a strict sense, and any medicament which contains a lesser proportion of the principle should be rejected.

If there be prescribed a determinate content of any special constituent, without special indication that this proportion constitutes a maximum or a minimum, the figure given is understood to be not incompatible with slight differences inherent in the preparation of the product and in the method of analysis.

When the pharmacopœia provides a medicament in diverse states of concentration, the simple mention of the medicament refers to the product designated by the corresponding title. Thus, the pharmacopœia describes hydrochloric acid in two states of concentration: *Acidum chlorhydricum*, containing 36.5 per cent., and *Acidum chlorhydricum dilutum*, containing 7.3 per cent. of hydrochloric acid gas: if "Hydrochloric acid"

be prescribed, without anything further, the medicament described under the rubric *Acidum chlorhydricum* is to be used. The dilute acid should never be employed unless specifically designated in the prescription.

The pharmacopœia is divided into two parts: the first, devoted to the description of the medicaments, their preparation and analysis; the second part contains the provisions relating to reagents, the description of certain analytic processes, a series of alcoholimetric tables, the chemical formulas and the solubilities of a number of medicaments.

This comprises, among other things, a series of lists established in the enforcement of the laws and regulations:

- (a) List of obligatory apparatus.
- (b) List of obligatory medicaments.
- (c) List of medicaments to be kept from air and light.
- (d) List of heroic medicaments.
- (e) Table of maximal doses.

Some of these lists should give us pause. Imagine, for instance, the furore which would be raised among some of our happy-go-lucky druggists, of free-and-easy equipment and unmentionable preparation, were some enterprising State legislature to pass a law requiring every pharmacy to be equipped with a microscope, with burettes and pipettes graduated to $\frac{1}{10}$ Cc., a balance to weigh accurately between a kilogram and a decigram, and another, sensitive to at least a milligram. Imagine, too, what some of the brethren would do with such an equipment if they had it! Think of the welcome which would be accorded the official inspector who would be required to certify that you had in stock, at any old time, not only a specified amount of each of a list of upwards of 500 medicaments, but that they were of pharmacopœial standard, then and there determined with official apparatus and solutions likewise required to be at hand.

There is also included in this second part a table of names and synonyms in which the pharmacopœial titles are designated by an asterisk, and the titles of those substances, the composition of which is regulated by the Brussels Conference, are printed in fat-faced type.

Coming now to the main portion of the book, the first part, we find a total of 722 titles: 22 general formulas and descriptions, 17 animal drugs, 168 vegetable drugs, 173 chemicals, 329 preparations, and 3 cross references.

As to classification, the alphabetic order, under the Latin titles, is preserved. Wulff (Ber. d. phar. Gesellsch., Berl., 1906, v. 16, pp. 251-264) notes that this order permits all of the preparations to appear alphabetically with the drug itself. But the inconvenience of a too rigid and mechanical adherence to such an order is seen, for instance, in the interpolation of *Acidi citri syrupus*, *Acidi tannici glyceritum*, *Acidum aceticum*, *Acidum aceticum dilutum* and *Acidum benzoicum*, between *Acidi boric* *unguentum* and *Acidum boricum*.

It has also been a matter of comment that while the international agreement has been followed as to titles, requirements and formulas, the latter are not specifically designated in the text, either by the initials F. I. (formula internationalis) or by some special typographic sign. The now obsolete nomenclature of *Acidum carbolicum* is retained in the title, though the synonyms *Acide phénique* and *Acidum phénicum* are given.

Among the accepted titles we find antipyrine and phenacetin, while such terms as *aristol*, *dermatol*, *diuretin*, etc., appear as synonyms for the respective compounds. The synonyms, by the way, are confined almost exclusively to the French text. There is, too, rather an inordinate number of homonyms; while we may have been brought up on Fowler's solution or Sydenham's laudanum, van Swieten's solution, de Haen's pills and Helmerich's pomade make one sigh for a saner nomenclature, based upon international agreement.

Serum Antidiphthericum and *Serum Antitetanicum* were introduced, though without any indication as to standards. Since 1906, it is understood, the Ehrlich standard has been adopted for the former; as to the latter, a standard has been perfected in the Hygienic Laboratory, U. S. Public Health and Marine Hospital Service, and the director of this Laboratory was advised, under date of March 24, 1910, of its endorsement by the Belgian government, the writer of this official notification paying high tribute to the excellence of the American standard.

For *Tuberculinum* there is no standard, though the method of preparation is stated. *Vaccinum* is to be prepared by an official commission at the central vaccine institute, connected with the school of veterinary medicine of Brussels-Cureghem.

The details as to compliance with the protocol of the Brussels Conference, have been compiled by my friend and colleague, Mr. M. I. Wilbert and will be presented in another paper before this section.

On the whole, one may well wish that the makers of the United States Pharmacopœia might emulate their European cousins in looking upon the Pharmacopœia rather as a scientific work, for the protection of the general public, than as a book of more or less commercial standards, compiled in behalf and at the behest of trades' or merely professional interests.

Mr. Eliel said he took exception as a pharmacist to the statement contained in the paper about the conditions found in drug-stores in this country, and expressed the opinion that if the conditions prevailing in Continental countries as to inspection applied in this country, there would be no ground for the criticism. Referring to the claim of commercialism he had heard made against American Pharmacy, he said he did not know of anything that was on a more thoroughly commercial basis in this country to-day than the practice of medicine. In the U. S. P. and N. F., great stress was laid by physicians on requiring the elimination of therapeutic titles. As a matter of fact, neither the U. S. P. nor the N. F. con-

tained one-tenth as many therapeutic titles as the German, Belgian, Austrian and other Pharmacopœias of other countries, where the practice of medicine was on a very much higher plane than it was in this country.

The Chair said that no doubt Mr. Eliel was right in this respect, but he thought Mr. Motter was evidently not considering such pharmacists as Mr. Eliel when he made the statement objected to. Continuing, the Chair stated that he thought Mr. Motter's paper showed that the pharmacists of this country would have to be very careful in compounding foreign prescriptions, because, as he had pointed out as to the Austrian Pharmacopœia, acetic acid, for instance, was diluted to the greatest extent in that country, whereas in the Belgian it was the most concentrated.

At the request of the Chair, Mr. Dunning then proceeded to read a paper upon the French Pharmacopœia, or "Codex."

REVIEW OF THE FRENCH CODEX.

The present revised edition of the French Codex went into effect Sept. 15, 1908. It is a volume containing 1,023 pages, printed in the French language; Latin names are used as synonyms for titles of drugs appearing therein.

The subject-matter is discussed under a number of headings. First appears the report to the president of the French Republic by commission appointed to revise the previous edition. This report includes a statement regarding the character of the previous edition, and the authority for and composition of the commission having the present revision in charge.

In all the Commission was composed of sixteen original members, four being medical men, eight pharmaceutical; other members were the director of higher education, who acted as president, a professor in a Veterinary School, director of Pasteur Institute and one other connected with the department of education. During the existence of the Commission five members were deceased, three were replaced by pharmacists and two from the department of education. The official sanction to the publication of the Codex is requested of the President.

The degree of the President comes next in order which consists principally of a statement in regard to his acceptance of the Commission's report and the attachment of his official signature.

Most interesting is the vast amount of work necessitated by the following program of revision; 913 preparations were dismissed, 575 galenicals, 210 drugs, 98 chemicals and 30 veterinary preparations; 154 preparations were added, and 131 old formulas revised.

The present Codex contains 1,125 monographs, chemicals 291, drugs 290, galenicals 429, surgical dressings 7, descriptions of powdered drugs 27, general descriptions 46, veterinary preparations 27 sera and vaccines 8. These include formulas for medicated baths, fumigations, gargles, mustard foot-baths, 48 teas, 51 syrups, specific gravity and percentage tables,

refractive indices for several volatile oils, also optical rotation, in some cases, for solutions of chemicals.

New remedies are included under the scientific chemical name.

Chapter on physiological preparations, general information respecting extracts from animal organism, intended for injections, sera and vaccines, including diphtheria antitoxin, antipest serum, antistreptococcus serum, antitetanus serum and antivenom serum, tubercular and antipest vaccines.

Veterinary preparations, 17 articles including description of mallein and tuberculin.

Appendices.

List of toxic drugs, kept under lock and key, name in black on orange-ground ; list of drugs to be kept from others, black on green labels.

Terms of Brussels convention.

Table of atomic weights.

Drop table.

Chapter on various methods of determining specific gravity.

Alcohol table.

Reagents and volumetric solutions.

List of omissions, additions and alterations.

Table of maximum doses.

Extracts from laws and regulations affecting the exercise of the pharmaceutical profession and relating to pharmaceutical studies.

General index.

With some necessary exceptions the Commission conform to the decision of the Brussels Conference in regard to the formulas for heroic remedies, which necessitated changing the strength of a number of the preparations ; of particular interest being the increase in strength of tincture of *ignatia* $2\frac{1}{2}$ times.

The older order and system of classification of medicines is entirely reconstructed. The principal classes are "simple drugs of animal or vegetable origin ;" "chemicals and galenicals" are together, alphabetically arranged. The other drugs are included under physiological preparations, which are further subdivided, and veterinary medicines.

Regarding the tests an innovation is practiced, in that tests for impurities are given in smaller type, while the impurity to be detected appears in parentheses and in italics.

The employment of the polariscope as a means of testing is mentioned not only in connection with its use in assaying volatile oils, but also with certain alkaloids and other substances.

Under the heading "Mode of Employment" are given the official preparations in which the particular substance appears and has no reference to therapeutic use.

In the discussion of those substances which are poisonous, the relative terms *tres toxique*, *toxique* and "a separer" occur in heavy black type.

Referring to the chemicals, which appear in the principal division of the book as before stated, the acids appear in alphabetical order in accordance with the name of the acid; for instance, acetic acid, chlorhydric acid, etc., while the metallic compounds and alkaloids are arranged according to a like provision, calcium sulphate, etc.

Molecular, empirical and constitutional formulas are given.

Each substance is described in the following order:

Name in French (the principal title), Latin name.

b. Formulas.

c. Preparation.

d. Physical and chemical characteristics, special properties.

e. Tests of identity and purity and for impurities.

f. Dosage (that is assay).

g. Conservation.

h. Incompatibilities.

i. Mode of employment.

Method of preparation of medicinal chemicals or active principles are not given when they may be obtained in commerce in a pure state, but when these substances may vary in accordance with the method, then formulas are given.

In this connection, I desire to remark that the number of chemicals for which the Codex gives processes for preparing are far in excess of those appearing in the U. S. P.; as example may be mentioned scale salts of iron, arsenate of iron and many other such as would be of no value in our own Pharmacopœia.

In regard to drugs which were included in the previous Codex but few were accompanied by proper definition and description nor were methods of standardization and assaying chemicals or galenicals included. These methods or processes are introduced into the present Codex in much larger numbers and are far more extensive and comprehensive than in the U. S. P.

It appears to me that in some instances extravagantly comprehensive might be applied.

The revised Codex now contains a special article for each substance discussed although general processes are referred to whenever such seem applicable.

In my opinion one of the most important improvements.

The maximum doses of drugs, which are not to be exceeded except in special instances, are given in a table in one of the appendices. This I believe to be a good feature, inasmuch as the term maximum may be defined as meaning dose sufficiently large to question. In case the physician desires to direct a larger dose than the so-called maximum he indicates his intention by the words "re dis" which is equivalent to "O. K" in America.

It is my intention to conclude this brief review with equally brief or briefer comments on some of the substances, either as classes or individually, which appear in the principal part of the book.

The general character of the contents of the French Codex differs widely from that of the United States Pharmacopœia, particularly as regards the type of some of the preparations, notably, teas, medicated baths, fumigations, gargles, foot-baths, etc., and furthermore many drugs the medicinal value of which the U. S. P. committee would not consider of sufficient importance to recognize, but are found in our Dispensatories as one of the many.

In fact the French Codex, in many respects, more closely resembles an American Dispensatory than the American or rather the United States Pharmacopœia. As an illustration of this point may be mentioned the full information offered in regard to many physical and chemical characteristics of substances which are not required for the purpose of standardization; under acetic acid for instance, I note the following: "It dissolves camphor, the resins, etc. Under the same heading a discussion regarding the relation between the density of acetic acid and its strength is incorporated.

No assay methods are directed for the drugs proper, aconite, belladonna, etc., but for their preparations.

Now referring to the several classes of galenical preparations:

Alcoolats are substances, simple or compound, prepared by macerating with alcohol of varying strength and then distilling.

Alcoolatures are prepared by macerating the substance with 80 or 95 per cent. alcohol and expressing.

Hydrolats correspond in some respects to our aromatic waters but are prepared by macerating the drug with water and subsequently distilling. Peppermint water is so prepared.

Some of these preparations remind one of Warburg's Tincture containing from 16 to 19 ingredients, Electuarium Diascordium being a fair example.

Six elixirs are recognized; they do not resemble the American elixirs, so much as they do the wines. They vary greatly in alcoholic strength ranging from about 60 per cent. in Elixir paregorique, while Elixir garu contains about 40 per cent. and enough sugar to make a fairly heavy syrup, Elixir cocoa is very weak in alcohol and contains but little sugar, and Elixir of Pepsin is more a wine than an Elixir.

The plasters seem to be more complex than necessary. Adhesive plaster contains eight ingredients, diachylon plaster nine, and mercury plaster eleven.

Three emulsions are included in the Codex—emulsion of sweet almonds, coal tar and cod-liver oil. Coal-tar emulsion is a soap bark alcoholic solution of coal tar mixed with water. Cod liver oil is emulsified with a hot solution of Irish moss.

Sponge and aseptic sponge are recognized. Several species are also included, one of which contains a combination of 17 leaves and flowers.

Eighteen essences (volatile oils) are recognized. Bergamot, cinnamon, cloves, lavender, santal, thyme, are accompanied by assay processes, most of the others by special tests for identity and purity; all are accompanied by tests for characteristic properties and some few are directed to be examined with the polariscope.

The extracts are divided into four classes; fluid extracts correspond in strength to weight of drug employed.

Soft extracts having the consistency of honey, firm extracts and powdered extracts.

Drug is prepared in each instance by moistening, then macerating for ten hours, packing in percolator, covering with menstruum, which is allowed to percolate until it commences to drop, when the orifice is closed and the drug is further macerated for 24 hours.

All the extracts containing alkaloids are directed to be assayed. Tests of identity are included for many others.

These assay processes differ considerably in detail from those of the U. S. P. Regarding the efficiency of these processes, I shall not attempt to pass judgment or make comparison to any great extent. In the assay of opium the drug is mixed with lime and extracted, no alcohol is used in connection with the assay.

There are 44 of these extracts, eleven of them are fluid, only the soft extract of digitalis, powdered extract of nux vomica, aconite and belladonna are recognized.

Aconite and belladonna assays are probably more tedious than the corresponding methods of the U. S. P.

Fumigating formulas are included which are combinations of chemicals for liberating chlorine; and sulphur in form for burning; four formulas for gargles and four for medicated gauze, four for honeys.

OINTMENTS.

Lard, benzoinated lard and vaseline are the bases directed for ointments. They resemble in character of the formulas the ointments of the U. S. P.

One rather interesting ointment is that of chloroform 10 per cent. in white wax and lard.

A much larger number of ointments is recognized in the Codex than in the U. S. P.

The yellow oxide of mercury ointment is directed to be prepared with vaseline, which I believe to be an excellent base for this purpose. Oxide of zinc ointment is prepared in vaseline 10 per cent. Mercurial ointment is prepared with lard. The Codex includes an ointment of salol.

Several potions of questionable value are included in the Codex.

SYRUPS.

The French Codex syrups are of a character distinctively different from those of the U. S. P.

Syrup of aconite, tincture of aconite and syrup ; syrup of potassium bromide, syrup of morphine ; syrup of codeine ; syrup of digitalis, tincture digitalis and syrup ; syrup iodide of mercury, potassium iodide, mercury biniodide, water and syrup and many more of like character are included under this heading.

There are fifty syrups ; quite a few are accompanied by tests when the character of contents would indicate the necessity of.

Some of the syrups are prepared by heating the principal constituent with the simple syrup on a water bath and subsequently filtering. Syrup of tolu is prepared by heating tolu with water for two hours on a water bath with frequent agitation, filtering and dissolving sugar in filtrate.

The simple syrup is not a saturated solution of sugar, most others being more or less saturated with sugar.

TINCTURES.

There are fifty-five tinctures recognized.

These tinctures are prepared by maceration, simple solution or by percolation, the latter process being used only with those tinctures which conform to the requirements of the Brussels Conference. The alcoholic strength of these preparations ranges from 60 to 95 per cent.

Tinctures of potent drugs are prepared by percolation with 70 per cent. alcohol as the menstruum, and of strength ten times greater than the drug employed.

Tincture formulas are accompanied by description of physical characteristics, tests of identity of finished preparation, and those which are assayable are accompanied by assay processes.

The Chair exhibited a volume of the French Codex, and spoke of its poor binding. He also called attention to the French labels for external use—red, printed in black.

Mr. Wilbert also explained the arrangement of the Codex, and compared the present edition with the Codex of 1884, and said it contained upward of 640 less titles. In France, an article not embraced in the present Codex was considered official if it appeared in the previous edition, as the Attorney General had decreed that an article found in the former Codex was quite as official as one in the present volume. On the strength of that decision they had reduced the number of titles very considerably. He said the polypharmaceutical preparations were more fully represented in the French Codex than any other pharmacopœia.

Mr. Hallberg said that the former Pharmacopœia had the tri-color—red, white and blue. He said that whenever a preparation seemed to be used sufficiently to warrant it, it was included in the Codex. He thought

the system prevailing there had contributed to a more scientific class of proprietaries in France than in this country.

The Chair called attention to the fact that the commission to revise the Codex seemed to be largely composed of pharmacists. He went on to say that the third edition of the Codex was published in 1886, the fourth in 1894, and the fifth edition in 1908. As to the polypharmaceutical preparations spoken of, he said that, whereas the edition of 1866 contained 99 such preparations, the fourth edition, published in 1894, contained only 56, and the new Codex contained none at all.

Mr. White asked Mr. Dunning if there was any reference in the French Codex to a class of preparations known as "ampoules," and Mr. Dunning replied in the negative.

Mr. Dunning stated that the French Codex, in the matter of description of chemicals and drugs, reminded him much more of the American Dispensatories than it did of the United States Pharmacopœia. He disclaimed that in so saying he meant to say anything derogatory to the Dispensatories.

The Chair stated that the German Pharmacopœia was the next item on the program, but that, in the absence of the author, Mr. Goetting, he himself would give a short abstract of it. This he proceeded to do, the full text of the paper being as follows :

SOME REMARKS ON THE GERMAN PHARMACOPŒIA.

BY E. C. GOETTING.

INTRODUCTORY.

A pharmacopœia is in my opinion not a book for study but a law book, written for the purpose, to be a guide for physicians and druggists and manufacturers. In order to fulfill this purpose, it must not be too voluminous and complicated, the wording should be plain and the demands in regard to purity of chemicals and strength of drugs and preparations should be precise and distinct. It is an undisputed fact, that too rigid laws are bad laws, that they always become unpopular and therefore cannot be properly enforced. For this reason it seems to be advisable, that the revisers of a pharmacopœia in their demands should not be narrow-minded and unduly scrupulous in regard to the purity of chemicals and drugs, by which the price of medicines might be unnecessarily increased and the jobbers and retailers be tempted to try to evade the stipulations of the law.

HOW THE GERMAN PHARMACOPŒIA IS REVISED.

The revision of the German Pharmacopœia is entrusted to a stationary commission, headed by the director of the Health Department, (Kaiserliches Gesundheits Amt). The commission consists of members of the department and 18 or more delegates of the medical faculties, experts of

serum therapeutic practices, chemistry, pharmacognosy and pharmacy and also members of the veterinary schools. All of these are appointed by the German Chancellor. This Commission has to keep in touch with the advance of pharmacy and medicine and must report every two years to the Chancellor all changes, which they deem advisable to be made in the Pharmacopœia. In order to have the report complete and embracing all parts of the empire the Commission requests the owners of large pharmacies in cities and country, to forward their individual opinion in regard to the omission of older remedies and the incorporation of new ones.

All this material together with the recommendations gathered from articles in the pharmaceutical journals is systematically arranged and put before the Commission, who after agreeing as to which new remedies should appear in the new edition of the Pharmacopœia, place the whole material before the members of the pharmaceutical committee for revision and approval. This report is sent to each member of the Commission and when the whole Commission soon meets again and its members have agreed upon the contents of the Pharmacopœia and have decided in regard to the quality of drugs, chemicals and the most desirable preparations therefrom and the methods making them, the whole work is finally approved by the Health Department and ordered to become a law.

THE TEXT OF THE PHARMACOPŒIA.

When we take the German Pharmacopœia at hand, we notice, that it is decidedly less voluminous than the U. S. P., not in regard to the number of drugs and preparations but mainly in regard to the description of manipulations for making preparations and methods to ascertain identity and purity of chemicals.

I am of the opinion that this is a decided advantage. The text is short and distinct, and anything not necessary for the purpose has been avoided. The formulas seem to be arranged better and more practically for laboratory work. There are no repetitions, while in the U. S. P. the process of maceration and percolation is repeated at every tincture and fluidextract. The revisers of the German Pharmacopœia seem to have more confidence in the practical education and experience of the druggist, as they do not consider it necessary to minutely describe the *modus operandi* at each preparation.

FLUIDEXTRACTS.

Fluidextracts are not very much favored in Germany, but I do not doubt that in the next edition more fluidextracts will be found. They are without doubt very useful preparations for the pharmacist as well as for the physician.

TINCTURES.

According to the German Pharmacopœia all tinctures are made by maceration. This has been the custom in Germany for years and as even

here in our country, where all tinctures are percolated, practical men claim, that for the preparation of tinctures maceration is preferable, a change in the German Pharmacopœia in regard to tincture is not to be expected. There is no doubt that percolation has its advantages, as well as disadvantages, but nobody will dispute that the quality of a tincture to be made by percolation depends mostly on the practical experience and training of the man in the laboratory.

SYRUPS.

The German Pharmacopœia orders the syrups to be made from the herb directly, with the addition of a little alcohol to the menstruum. Most of the alcohol will evaporate when the sugar is dissolved by heat; the addition of some glycerin therefore would be advisable to prevent fermentation. The U. S. P. syrups are made with fluidextracts. They are much stronger and some of them contain enough alcohol to prevent fermentation, while others could be improved by the addition of glycerin.

OINTMENTS.

The German Pharmacopœia provides for all ointments a base, which will not get rancid. Also the U. S. P. seems to favor the petroleum base and woolfat, but some ointments, Ungt. Gallæ., Ungt. Belladonnæ, etc. have to be made with a base, which gets rancid and lumpy very soon. This ought to be changed.

ASSAYS.

The German Pharmacopœia demands in comparison with the U. S. P. a few assays only. This seems to be a disadvantage, but when we consider, that according to high authority the methods for some of these assays are not reliable, it is perhaps wiser to omit them than to bulk the Pharmacopœia with tests, by which the strength of a preparation cannot be ascertained with absolute security.

REAGENTS.

We find the formulas for reagents and volumetric solutions in the German Pharmacopœia on 12 pages, while the U. S. P. 50 pages are devoted to the same subject. This is decidedly unnecessary. Some of the formulas can be given in shorter terms and others, f. i. those for special tests and Vol. Sol. belong in a text-book of chemistry and not in the Pharmacopœia.

TABLES.

The German Pharmacopœia has only a few tables, one of which, the dose table, can be omitted, as all the doses have been stated in the respective paragraphs. Some of the tables in the U. S. P. VIII are quite useful, others again might just as well be omitted, as they are hardly ever used.

Much more could be said in regard to the subject, but as the article is not intended to touch details, I will come to a close. Only one more point I wish to bring out, that is to warn the Committee of Revision of all Pharmacopœias, to avoid in the formulas of preparations such changes, by which color and taste of the article is impaired. Any such changes for obvious reasons should be made only when they are absolutely necessary.

N. Y. City, April, 1910.

Mr. Hallberg remarked that this was the only one of the Pharmacopœias that was not called "Pharmacopœia."

A paper on the Pharmacopœia of Great Britain, by E. H. Gane, was, in the absence of the writer, read by title and referred to :

A COMPARISON OF THE BRITISH AND U. S. PHARMACOPŒIAS.

BY E. H. GANE, NEW YORK CITY.

The current British Pharmacopœia issued in 1898 was notable from the fact that for the first time pharmacists were invited to aid in its revision. The British Pharmacopœia is published by the General Medical Council of the United Kingdom under Act of Parliament and the Council has always been exceedingly jealous of its prerogatives. Consequently, while a formal invitation was sent to the Pharmaceutical Society of Great Britain inviting its cooperation, the committee appointed in response to the suggestion had no real power and its recommendations were at all times subject to the veto of the General Medical Council. The position of the committee was a rather anomalous one and many pharmacists thought that the Society would have done better to have declined to act under any such conditions. The published book, however, bears evidence of the fact that the Pharmaceutical Society's committee of practical pharmacists had a great deal to do with improving the character of the British Pharmacopœia, for no such volume of criticism greeted the 1898 revision as was aroused by the 1885 issue.

The above brief mention of conditions is made for the purpose of explaining why certain sharp points of difference are noticeable between the British and the U. S. Pharmacopœias.

It is impossible in the limits of a brief review to point out all the important features of the B. P. even if it were desirable to do so. It would seem that the most useful purpose of a series of papers such as we are having presented, would be served by pointing out the principal points of difference between the two books, with the ultimate idea of obtaining in all countries a uniform standard of medicinal products so that no matter where a patient may find himself, he can be reasonably sure of getting a prescription dispensed in uniform manner. This should be the desire of Pharmacopœia revisers the world over.

For the purpose of this discussion it seems best to briefly note the general

characters of the British Pharmacopœia and then devote our attention to the differences in strength and composition of the products common to the two Pharmacopœias.

NOMENCLATURE.

Little comment is required in this connection. As might be expected the Latin titles of botanicals and galenicals are rather more accurate in the B. P. while the U. S. P. is more up to date in the use of chemical terms. We do not find any such monstrosities as "Carbonei and Fluidextractum" in the B. P. and again we find some instances where the British titles are more accurate than our own. For instance "Aqua ammoniæ" and "Aqua hydrogenii dioxidi" are more accurately designated as "Liquores." Botanicals are designated more accurately by appending the part used as "Acaciæ gummi" in place of "Acacia," "Digitalis folia," "Conii fructus," "Cinchonæ cortex," "Ipecacuanhæ radix," etc. "Caryophyllus" is "Caryophyllum" in British eyes, "Fel bovis" is "Fel bovinum" and "Glandulæ Thyroideæ siccæ" is simplified into "Thyroideum siccum." "Petrolatum" is "Paraffinum," "durum," "molle" or "liquidum" according to variety and "Paregoric" is "Tinctura Camphoræ composita."

The Englishman's conservatism is displayed in the continued use of "Acidum carbolicum," "Soda Tartarata" "Potassa Caustica" and "Sulphocarbolas." Both pharmacopœias continue the use of the well understood but inaccurate "Liquor Calcis" and both append "Solution of Calcium hydroxide" as the English equivalent though the British preface states that the English title is not to be taken as a translation of the Latin. Many of these differences will probably be adjusted in subsequent revisions.

BOTANY AND PHARMACOGNOSY.

The botanical names of the British Pharmacopœia¹ differ in some instances from those of the U. S. P. and this is due to the fact that the names in the British Pharmacopœia have been brought into accordance with the "Index Kewensis." The wording of the descriptions and characters of the various drugs was carefully done so as to limit the quality to be used. In the case of some twenty drugs ash limits were set to aid in detecting adulterations.

CHEMISTRY.

The chemistry of the British Pharmacopœia has been so fully dealt with that further comment at this time is hardly necessary. The principal fact which aroused comment was the indefinite character of the test for impurities in chemicals. Instead of placing limits on the impurities allowable the text says that a solution (strength not stated) "should yield no *characteristic reaction* with the tests for lead, copper, arsenic, iron etc. or "not more than the *slightest characteristic reactions* with the tests" for certain

impurities. In this respect the limits of impurity designated in the U. S. P. are a great step in advance. Processes for making chemicals were generally dropped from the last revision and in spite of the indefinite character of the tests mentioned above the chemistry of the British Pharmacopœia was a distinct advance over previous editions. As with our own Pharmacopœia the tests for certain chemicals were regarded as too stringent, inasmuch as the required condition of purity was not obtainable on the commercial scale without too great a cost.

WEIGHTS AND MEASURES.

The British Pharmacopœia employs both the Imperial and Metric denominations, giving the relative proportions side by side as in the N. F. It is to be hoped that the next edition of the U. S. P. will return to this arrangement as there does not seem to be any likelihood of the metric system being adopted as a uniform system for many, many years to come. So long as the *avoirdupois* system remains the standard of commerce it is idle to attempt to force upon pharmacists the adoption of another which is not "understanded of the people."

GALENICALS.

This portion of the British Pharmacopœia has been very generally commended not only by the retail pharmacists but by those engaged in manufacturing on the large scale. The formulæ and processes are evidently the result of careful investigation and the preparations generally are worthy examples of pharmaceutical science. Especially is to be commended the omission of detailed description of operations which can only be satisfactorily performed on a large scale. In general the directions for preparation are concise and yet clear thereby saving much in the bulk of the book. One of the chief objections to the U. S. P. is the unnecessary amount of detailed description of processes for preparing galenical preparations. We might well take example from the British Pharmacopœia in this respect. How much simpler are the few words "Prepare by the maceration process," to the detailed and unnecessary instructions following the preparations of the U. S. P. The pharmacopœia should presuppose a knowledge of the elements of pharmacy on the part of its users.

The most interesting addition to the last British Pharmacopœia was the class of "concentrated liquors" introduced to meet the demand for preparations which, when diluted, would represent the old infusions and decoctions. These liquors had for years been prepared by manufacturing houses and in spite of much adverse criticism the British Pharmacopœia formally recognized them. They are intended to represent a concentration of about ten times that of the simple infusion. They are prepared in some instances by maceration with water, expression and addition of alcohol to preserve, or by percolation with 20 per cent. alcohol, the process varying

according to the drug used. There are nine concentrated liquors in all and they are used by diluting 1 part with 9 parts of water.

The following table shows the principal point of difference between the galenicals common to the British Pharmacopœia and the U. S. P.

<i>Preparation.</i>	<i>How Differs from the U. S. P.</i>
Acetum scillæ.....	Stronger, 8 Cc. equals 10 Cc., U. S. P.
Alcohol	Weaker, 90 per cent.
Aqua camphoræ.....	One-eighth as strong.
“ chloroformi	One-half strength.
Extractum belladonnæ, liq.....	Nearly twice as strong; 0.75 per cent.
“ glycyrrhizæ	Made from root.
“ hamamelidis, liq.....	Contains no glycerin.
“ hydrastis, liq.....	“ “ not assayed.
“ sarsæ, liq.....	“ glycerin, 10 per cent.
Glycerinum acidi tannici.....	Proportions by weight.
“ amyli	Contains three times as much water.
“ boroglycerini	Thirty per cent. by weight.
“ acidi carbolicæ.....	Proportions by weight.
Infusum digitalis.....	About half as strong, 0.68 in 100.
Linimentum ammoniæ	Liq. ammon, 25; almond oil, 25; olive oil, 50.
Linimentum belladonnæ....	Fluidextract bellad., 250; camphor, 25 in 500. Almost same as U. S. P.
Linimentum chloroformi	Chloroform, 1; liniment of camphor, 1.
“ camphoræ.....	Made with olive oil.
“ saponis	Made with soft soap.
“ terebinthinæ.....	Made with soft soap and camphor.
Liquor arsenicalis	One gramme in 100 Cc.
“ arsenici hydrochloricus	“ “
“ arsenii et hyd. iodid.....	“ “
“ ferri perchloridi fort.....	Contains nearly 16 per cent. metallic iron.
“ ferri persulphatis.....	Very slightly stronger; 10.2 per cent. iron.
“ potassæ	Stronger, 5.85 per cent.
“ sodæ chlorinatæ	About same strength, 2.5 per cent. Cl.
“ zinci chloridi	Stronger, nearly 55 per cent.
Mistura cretæ.....	Contains tragacanth in place of acacia.
“ ferri comp... ..	Proportions different.
Mucilago acaciæ.....	One part to 1½ parts water.
“ tragacanthæ.....	Alcohol used in place of glycerin.
Pilulæ.....	Proportions generally different; syrup of glucose used mainly as excipient.
Pulvis glycyrrhizæ compositus.....	Proportions different. Fennel fruit used in place of oil.
Pulvis jalapæ co.....	Contains ginger.
“ ipecacuanhæ co.....	“ potassium sulphate.
“ rhei co.....	Proportions slightly different.
“ sodæ tartaratæ effervescens....	“ “ “
Spiritus ætheris comp.....	Prepared by distillation.
“ “ nitrosi	“ “ 2 per cent. ethyl nitrate.

*Preparation.**How differs from the U. S. P.*

Spiritus ammoniæ aromaticus.....	Slightly different proportions; oils and alcohol distilled.
Spiritus chloroformi	Weaker; 5 per cent.
“ nitroglycerini	One Gm. in 100 Cc.; 1.19 per cent.
“ lavandulæ	Double strength; 10 per cent.
“ vini gallici.....	Weaker; 36½ to 43½ per cent. by volume.
Suppositoria glycerini	Made with gelatin; 70 per cent. glycerin.
Syrupus	S. G. 1.330; 5 lbs. sugar in 7½ lbs. syrup.
“ aurantii	Made with tincture only, 1 to 7.
“ ferri iodidi.....	Stronger. 7.25 per cent.
“ “ Phosphatis cum quinina et strychnina.....	Made from fresh ppt. iron phosphate, contains less quinine and strychnine.
“ pruni virginianæ.....	Contain more sugar, less glycerin.
“ rhei	Half strength, made from the drug and coriander fruit in place of cinnamon.
“ rosæ.....	Made direct from flowers, no acid.
“ sennæ.....	Made from the drug, nearly twice as strong.
“ tolu	Made from the balsam.
“ zingiberis.....	Slightly weaker. Process different.
Tinctura aconiti.....	Half strength, 5 per cent. 70 per cent. alcohol.
“ aloes	Barbados aloes, one fourth strength.
“ arnicæ	Made from the rhizome.
“ asafœtidæ	Made with 70 per cent. alcohol.
“ aurantii	Made from fresh peel, one-half strength.
“ belladonnæ.....	Made from standardized fluidextract of root, 0.048 to 0.052 per cent. alkaloids.
“ benzoini comp.....	Proportions slightly different.
“ calumbæ	Half strength, 10 per cent.
“ cantharidis.....	Stronger, 17.5 per cent.
“ capsici.....	Proportions different, no glycerin, contains resins.
“ cardamomi comp.....	Half strength, 10 per cent.
“ cinchonæ comp.....	Contains cochineal and saffron, process different.
“ cinnamomi	Made with 70 per cent. alcohol, no glycerin.
“ colchici seminum.....	Double strength, 20 per cent., not assayed.
“ digitalis.....	Stronger, 12.5 per cent.
“ ferri perchloridi.....	Stronger, 5.6 per cent. iron.
“ gentianæ composita.....	Slightly different proportions.
“ guaiaci ammoniata.....	Process different, solution of ammonia and oils used in place of spir. ammon. arom.
“ hydrastis	One-half strength, 10 per cent.
“ iodi	About one-third strength, 2.5 per cent. by volume.
“ kino.....	Double strength, 10 per cent.
“ lavandulæ comp.....	One-half strength, made with 90 per cent. alcohol.
“ limonis	One-half strength.

<i>Preparation.</i>	<i>How Differs from the U. S. P.</i>
Tinctura lobeliæ æthereæ.....	Made with spirit of ether, double strength, 20 per cent.
“ nucis vomicæ.....	Two and one-half times as strong, 0.25 per strychnine.
“ opii	Weaker, 0.7 to 0.8 per cent. morphine.
“ quassiae.....	One-half strength.
“ quillaie	One quarter strength, 5 per cent.
“ scillæ	Double strength, 20 per cent.
“ stramonii	Double strength, 20 per cent.
“ strophanthi	One-fourth as strong, 2.5 per cent.
“ toluana.	One-half strength.
“ valerianæ ammon.	Process different, same as guaiacum.
“ zingiberis	One-half strength, 10 per cent.
Trochiscus acidi tannici.....	One-half strength.
“ santonini	Double strength, one grain in each.
Unguentum acidi carbolicum	Slightly stronger, about 4 per cent. Phenol is dissolved in glycerin.
“ belladonnæ.....	Made with root extract standardized, benzoated lard base.
“ aquæ rosæ	No borax.
“ chrysarobini.....	Weaker, 4 per cent.
“ hydrargyri	One-third mercury.
“ hydrargyri nitratis.....	Made with lard and olive oil.
“ “ oxidi flavi.....	Weaker, about 2 per cent.
“ picis liquidæ.....	Stronger, 100 of tar to 40 beeswax.
“ sulphuris.....	Weaker, 10 per cent.
“ veratrinæ	Half strength, 2 per cent.
“ zinci	Weaker, 15 per cent.
Vinum antimoniale.....	Slightly stronger, 4 grammes in 875 Cc.
“ colchici	Made from the corn, 20 per cent.
“ ferri citratis.....	Made with orange wine, 18.3 grammes in 100 Cc.
“ ipecacuanhæ	Half strength, made with Sherry wine.

In addition to the galenicals there are a number of other products which differ in strength from the corresponding U. S. P. products.

<i>Name of Product.</i>	<i>How it Differs from U. S. P.</i>
Acid acetic	33 per cent. acid.
“ “ dil.....	4.27 per cent.
“ hydrochloricum dil.....	10.6 “
“ nitricum	70. “
“ “ dil.....	17.44 “
“ phosphoricum.....	66.3 “
“ “ dil.....	13.8 “
“ sulphuricum.....	98. “
“ “ dil.....	13.65 “
Aether	Contains “unimportant amount” of alcohol.
Amylum	From wheat or rice.
Asafetida	Not less than 65 per cent. alcohol-soluble.

<i>Name of Product.</i>	<i>How it Differs from U. S. P.</i>
Calx sulphurata.....	"Not much less than" 50 per cent. of calcium sulphide.
Calx chlorinata	33 per cent. available chlorine.
Cinchona	5 to 6 per cent. total alkaloids.
Ferrum redactum	75 per cent. iron.
Opium	9.5 to 10.5 per cent. morphine.
Phenol liquefactum.....	90.9 per cent. phenol.

STANDARDIZATION.

It was a disappointment to English pharmacists to find so limited an application of standardization processes to galenical preparations, but the wisdom of the revisers' decision has since become apparent. It is far better to exercise care in selecting the best crude drugs for pharmaceutical preparations than to admit all kinds of crude material and depend for quality on processes of standardization that are such only in name in many instances. With the exception of cinchona and opium no crude drugs are required to conform to any alkaloidal standard. Belladonna, nux vomica, cinchona and ipecac preparations are all assayed and a higher standard is generally required than is the case with the U. S. P. products. None of the essential oils are quantitatively examined, the revisers relying altogether on physical constants as criteria of purity.

The assay processes for the galenicals follow well established lines but are somewhat different from those used in the U. S. P. In the case of ipecac the lead acetate process is employed and with nux vomica the strychnine is determined by the ferrocyanide process. With opium a check titration with decinormal sulphuric acid controls the gravimetric determination of the morphine content.

It is impossible in the limits of this paper to go into the details of the processes employed and it seems at this time unnecessary to deal with the B. P. at greater length as we are just on the eve of a new revision which promises to make a radical departure in British methods of pharmacopœial revision.

LEGAL STATUS OF THE B. P.

The British Pharmacopœia is not strictly speaking a legal standard and its position as a standard at all is not well defined. Neither the Medical Acts nor the Food and Drugs Acts refer to it in any way and the only British act which refers to it is the Pharmacy act of 1868 which stipulates that any person who shall compound any medicines of the British Pharmacopœia except according to its formularies shall for each offence be liable to a penalty of five pounds. Such penalty must be sued for as provided in the act, that is by the Pharmaceutical Society. Proceedings, however, for compounding medicines according to other than the B. P. have never been instituted and so far this clause has remained a dead

letter. Nevertheless it is illegal to compound official preparations in any other way than according to the B. P.

In proceedings under the sale of Food and Drugs Act references are constantly being made to B. P. standards and it is interesting to note in this connection that under English law the custom of the trade or country is taken into consideration in the administration of certain acts. The B. P. has become consequently a custom of the country, and therefore, a person asking for any preparation official in the B. P. ought to receive a preparation made according to official formula. In the event that he does not receive such a product, the clause of the Food and Drugs Act which states that the law is violated if the article sold "is not of the nature, substance and quality demanded" would undoubtedly operate to convict the seller. Such has generally been accepted as the status of the B. P. under the Food and Drugs Act. This obviously applies only to compounded articles. There is no provision for regulating the sale of uncompounded articles although there have been numerous convictions under the act for the sale of such products which did not conform to B. P. standards. It is doubtful, however, if these convictions would be sustained in the event of an appeal to the higher courts. Even with compound products the position is by no means clear and there has been considerable demand for legislation which would accurately define the legal position of the B. P. and set at rest the much discussed question of standards under the Food and Drugs Act.

The Pharmacopœia of Hungary was presented by A. R. L. Dohme, who said he would read only the general introduction and conclusion, on account of the length of the paper :

THE NEW HUNGARIAN PHARMACOPŒIA.

BY ALFRED R. L. DOHME AND HERMANN ENGELHARDT.

About twenty-five years after the issue of the Hungarian Pharmacopœia, second edition, the new third edition has appeared. The latter must be considered a very valuable addition to the other pharmacopœias which have appeared during the last decade, inasmuch as all the latest investigations as regards chemicals, preparations, etc., have been considered. In 355 pages the new pharmacopœia deals with about 550 different chemicals and preparations, about 114 of which do not appear in the U. S. P. nor in the N. F. Besides the description of these chemicals and preparations, 98 reagents are described, while directions for only 7 volumetric solutions are given.

One paragraph deals with the utensils, apparatus and instruments which are to be kept in a drug store, while other chapters contain tables for the maximum doses, an enumeration of those poisonous substances which have to be kept under lock, a table for the number of drops in each gram of the various liquid chemicals and solutions, and tables for the physical constants of hydrochloric acid, sulphuric acid, nitric acid, phosphoric acid,

lactic acid, ammonia, potassium carbonate, etc. The following chemicals, which do not appear in the U. S. P., are given in the new Hungarian Pharmacopœia :

Absinth	Carbolized water
Pyroligneous acid	Arecoline HBr.
Acetosalicic acid	Protargol
(Aspirin)	Bismuth tannate
Ethyl bromide	Bolus
Ethyl chloride	Castoreum
Ether for narcosis	Centaury
Ethyl morphine HCl	Mustard plaster
Marshmallow leaves	Quinine tannate
Ammonium sulphoichthyolate	Chloroform for narcosis
Amylene hydrate	Levant wormseed
Star anise	Codeine HCl
Antidote for arsenic	Caffeine and sodium benzoate
Antipyrin caffeine citrate	Caffeine and sodium salicylate
Antipyrin salicylate	Collemplastrum of zinc oxide
Collemplastrum of soap, salicylated	Chloroform oil
Saffron	Laurel oil
Copper aluminate	Oil of pinus sylvestris for inhalation
Zittmann's decoction	Sesame oil
Dextrin	Root of oronides spinosa
Electuaria	Poppy
Electuarium lenitivum	Lead carbonate
Equisetum	Prune pulp
δ-Eucaine HCl	Tamarind pulp
Euphorbium	Oak bark
Extract belladonna with dextrin	Pine resin purified
Extract benbane with dextrin	Rob of juniper
Extract kola	Rob of sambucus
Leeches	Salep
Mercury salicylate	Sambucus flowers
Hydromel infantum	Soaps (2)
Laxative infusion	Squills dried
Infusion of rhubarb	Tallow salicylated
Iris	Species
Solution of potassium acetate	Ethereal spirit of iron
Potassium sulphoguaiacolate	Antimony sulphide
Potassium sulphide	Syrup diacodii
Leonuri lanata	Syrup of potassium sulphoguaiacolate.
Surgical dressings (11)	Syrup of mannite
Storax liniment	Syrup of peppermint
Liquor ammoniæ anisat.	Tanninum albuminatum keratinatum
Liquor iron albuminate saccharated	Theobromine sodium salicylate
Peroxide of hydrogen 30 per cent.	Tincture of absinth
Malva flowers	Tinctura amara. (Bitter tincture)
Malva leaves	Tincture of castoreum
Manganese chloride	Tincture of chamomile.
Mannite	Leaves of trifolium fibrinum

Honey of rose
Mixture of bromal hydrate

Cantharides ointment
Cerussa ointment
Lead tannate ointment
Borated vaseline
Turkey root.
Zedoaria root

In the preface general rules for the use of the Pharmacopœia by drug-gists, physicians and veterinarians are given and then the various methods for determining the physical constants of the chemicals and preparations are discussed.

A few of these methods may be mentioned here :—

The sp. gr. is to be taken at 15° C. by weighing 100 Cc. of the liquid or solution at this temperature. The weight should be taken to 1 decigram. The sp. gr. thus obtained should be checked by a hydrometer or Westphal balance, or in the case of alcoholic liquids, with an alcoholometer.

The *melting point* is determined in a manner similar to that given in the U. S. P. It is directed, however, that the substances should previously be dried at 100° C. and such substances which decompose, when being exposed to such a temperature, should be dried in a dessicator over calcium chloride or sulphuric acid at ordinary temperature.

The *boiling point* is also determined by a process similar to that of the U. S. P.

The *congealing and melting points* of fats and waxes are determined by transferring to a beaker of about 100 Cc. contents 50 Gm. of the melted and filtered mass. Then the contents of the beaker are stirred with a thermometer until a faint cloudiness appears. The temperature at which this occurs is considered as the congealing point. The contents of the beaker are then heated gradually until a clear mass is obtained. The temperature at which this takes place is considered as the melting point.

Acid and saponification number.—For the determination of the acid number, 5.6 Gm. of the fat to be examined are dissolved in 20 Cc. of neutral alcohol and after the addition of a few drops of alcoholic phenolphthalein solution, titrated with tenth-normal caustic alkali until a permanent pink color is produced. The number of Cc. of caustic alkali used is equivalent to the acid number. In the determination of the fats which are not liquid at ordinary temperatures a heating of the mixture of alcohol and fat is prescribed.

The determination of the bromine and iodine number of fats.—An accurately weighed amount of fat or oil varying in quantity according to the chemical composition of the fat is dissolved in 20 Cc. of carbon tetrachloride and to this 100 Cc. of tenth-normal bromine solution, 2 Gm. of potassium bromide, and 25 Cc. of diluted hydrochloric acid are added. The bottle is then closed well and placed in a dark place. After $\frac{1}{2}$ hour

during which the bottle has been shaken frequently, 2 Gm. of potassium iodide are added, the mixture shaken again and then gradually tenth-normal thiosulphate solution is added until a colorless liquid is obtained. The Pharmacopœia directs that starch solution as an indicator should be used only when the titration is carried out in artificial light, or when the end point of the reaction is difficult to be seen. From the figures found the bromine number as well as the iodine number can easily be calculated.

A special chapter is then devoted to *sterilization*. The containers which are used for keeping sterilized solutions should be heated either for two hours in a drying oven at 160° C. or should be boiled in water for 15 minutes. The sterilization of those substances which are not decomposed by boiling water is to be done by a current of steam or in the following way:—The containers to be filled with the sterilized solution are first wiped out with a pledget of cotton impregnated with alcohol, then with ether, and if a filtration of the liquid is necessary, the funnel is sterilized in the same way. The containers plugged with sterile stoppers are then heated for $\frac{1}{4}$ of an hour at a temperature of 60 to 70° C. and this procedure has to be repeated if necessary, twice at intervals of one day each. Sterile ointments, oils and emulsions are prepared in a mortar previously cleaned with alcohol and ether.

Solutions.—The designation 1 to 10 or 1 to 20 means that one part of the substance is dissolved in nine or nineteen parts respectively of the solvents.

Size of drops.—For counting drops, a special dropping-bottle is prescribed, such as was adopted in 1902 by the Brussels Conference. 20 drops of distilled water should correspond to 1 Gm. at 15° C.

Temperature.—For measuring temperature, thermometers according to Celsius are to be used. 18° to 20° C is considered as the ordinary temperature. Digestions are to be made at 15° to 20° C., and macerations at 30° to 40° C. Specific gravities should be taken and reagents be made up at 15° C.

Preparations which are made according to the international formulas agreed upon in the Brussels Conference, 1902, are: Extract of belladonna leaves, extract of henbane, extract of nux vomica, extract of opium, extract of ergot, tincture of belladonna leaves, tincture of cantharides, tincture of colchicum, tincture of digitalis, tincture of ipecac, tincture of iodine, tincture of lobelia, tincture of nux vomica, tincture of opium, tincture of opium, camphorated, tincture of strophanthus.

It is directed that the following preparations be sterilized: electuaries, extract of licorice, purified, solution of potassium acetate, surgical dressings and nutriments.

Preparations to be pasteurized are the following: infusion laxative, infusion of rhubarb, purified honey, prune pulp, tamarind pulp, rob of juniper, rob of sambucus, syrup of manna and syrup of senega.

The following drugs are to be renewed after keeping for one year: Belladonna leaves, digitalis leaves, henbane, mellisa leaves, peppermint leaves, savin, prune pulp, rob of juniper, ergot, colchicum seed, linseed and tincture of colchicum.

The following preparations and drugs should be kept over calcium oxide (lime): mustard plaster, powdered extracts, dry squills and ergot.

The following preparations should be made by percolation: extract of belladonna leaves, fluidextract of cascara sagrada, fluidextract of cinchona, extract of cinchona, fluidextract of condurango, oleoresin of cubeb, oleoresin of malefern, fluidextract of golden seal, extract of henbane, extract of nux vomica, fluidextract of ergot, and tincture of orange for making syrup, tincture of belladonna leaves, tincture of cannabis indica and tincture of cantharides.

In the following most of those articles adopted by the Hungarian Pharmacopœia may be mentioned, the requirements of which differ from those in the U. S. P., also those the adoption of which can be recommended for the next U. S. P.

Acidum benzoicum.—Only the acid prepared from benzoin is recognized, and the test for chlorinated products generally indicating the presence of artificial acid is carried out by moistening a mixture of .5 Gm. of pure calcium carbonate with .25 Gm. of the acid, drying and igniting the mixture. The residue is then taken up in pure nitric acid, which solution on addition of silver nitrate solution should not give a turbidity.

Acidum carbolicum.—An assay process for this chemical is not given.

Acidum hydrochloricum concentratum.—The Pharmacopœia requires a sp. gr. 1.125, corresponding to about 25 per cent. of hydrochloric acid. This acid, therefore, is considerably weaker than that in the U. S. P., of which the sp. gr. is 1.158 at 25° C., corresponding to about 32 per cent. of hydrochloric acid.

Acidum nitricum concentratum.—The sp. gr. is given with 1.315 at 15° C., corresponding to 50 per cent. of absolute nitric acid, as compared with 1.403 at 25° C., corresponding to 68 per cent. of absolute nitric acid given in the U. S. P.

Acidum phosphoricum.—Only a diluted acid of 20 per cent. absolute phosphoric acid is official. It may be said here that the Hungarian Pharmacopœia almost throughout uses Bettendorf's reagent for the detection of arsenic.

Acidum sulphuricum concentratum.—A 95 per-cent. acid is official, possessing a sp. gr. of 1.847 at 15° C. This acid is slightly stronger than that of the U. S. P., which requires only 92½ per cent. of absolute acid.

Aconitum is not official.

Adeps lanae.—In the test for cholesterols, the chloroform used for dissolving the woolfat, as directed in the U. S. P., is replaced by carbon-tetrachloride, which, as may be mentioned here, is very widely used in the tests given in the Hungarian Pharmacopœia instead of chloroform or other

organic solvents. It is further directed that the wool fat should leave not more than 5 per cent. of ash on incineration. The acid number should be less than 1.

Ether aceticus.—The boiling point of this preparation is limited to from 74 to 76° C., therefore not having the wide range as given in the corrections of the U. S. P., i. e., 72 to 77° C.

Ether depuratus.—It is directed that if 10 Cc. of the ether be shaken with a saturated aqueous solution of calcium chloride the volume of the ether should not be decreased to any extent, thus allowing only very small quantities of water or alcohol.

Ether pro narcosi.—This preparation should have a sp. gr. not higher than .720 at 25° C. and should boil at exactly 35° C. The following test for the purity is given. 10 Cc. of ether shaken with 2 Cc. of water and a few drops of sulphuric acid should not produce a blue color on the addition of one drop of potassium dichromate solution. On adding to the ether a small piece of fused caustic potash and allowing the ether to stand in a dark place for six hours the potassium hydroxide should not be colored yellow. It is directed that the ether should be stored in amber bottles containing not more than 100 Cc. in a cold place.

Aloes.—When .05 Gm. of aloes are treated with 5 Cc. of nitric acid a red color should be produced. This shows that those species of aloes are official which are given in the U. S. P.

Ammonium bromatum.—The purity of this chemical is 98 per cent.

Amylum nitrosum.—It is required that this preparation should boil between 97° and 99° C. No assay process is given.

Antifebrinum (acetanilide.)—The following test is given for the detection of acetanilide: When acetanilide is heated in a dry test tube with an equal amount of dry zinc chloride to 250° C. an odor of locust flowers is developed.

Apomorphine hydrochloride.—A preparation of which a one per cent. aqueous solution turns green at once should be rejected. It is directed that the alkaloid be kept in dark bottles.

Aqua amygdalarum amararum.—The Pharmacopœia directs that all the aromatic waters be prepared by distilling the volatile oils from the respective drugs by live steam. The distillate is allowed to stand for several days in well-closed bottles, with frequent shaking, and is then filtered through wetted paper. 100 Gm. of the filtrate should not be rendered turbid by hydrogen sulphide and should not leave a residue on evaporating to dryness.

Aqua calcis.—The Pharmacopœia requires the lime water to contain not less than 0.13 per cent. and not more than 0.17 per cent. of calcium hydroxide.

Aqua chlorata.—The directions for making this preparation are: To 20 Gm. of coarsely powdered potassium dichromate, 200 Gm. of concentrated hydrochloric acid are added, the mixture is heated gently and the

chlorine gas absorbed by one liter of distilled water. The chlorine water thus obtained should contain .5 per cent. of chlorine gas.

• *Aqua destillata*.—Detailed directions are given for preparing distilled water from ordinary water, as regards the apparatus used for the distillation, the elimination of magnesium chloride, ammonia, organic matter, etc.; it is directed that only a sufficient quantity of water for immediate use be prepared.

Balsamum copaiba.—The sp. gr. of the balsam is given as .94 to .99, thus allowing a balsam with only a comparatively small amount of volatile oil. No requirements for the acid and saponification numbers are given. As test for rosin the unreliable test with ammonia water is given.

Balsamum Peru.—Fifty-six per cent. of cinnamein is required. Acid and saponification numbers are not given.

Balsamum tolu.—In the requirements for this drug the determination of the acid and saponification numbers are also omitted.

Belladonna folia.—No assay process is given. The only requirement is that the leaves should give by percolation with dilute alcohol 15 per cent. of extractive matter.

Benzinum.—The sp. gr. is given as 0.700 to 0.717. It is required that if 10 Cc. of the liquid be mixed with a cold mixture of 3 Cc. each of concentrated sulphuric acid and cold water the acid liquid should not turn yellow. Water shaken with benzin should not acquire an acid reaction.

Benzoë.—Not more than 10 per cent. should be insoluble in warm alcohol.

Bismuthum subgallicum.—This preparation should give on incineration 50 to 56 per cent. of bismuth oxide. The test for arsenic is made with Bettendorf's reagent.

Bismuthum subnitricum.—Should leave on incineration 76 to 82 per cent. of bismuth oxide.

Butyrum cacao.—The acid number should be less than 2, and the iodine number between 32 and 36.

Calcaria chlorinata.—This preparation should contain 25 per cent. of available chlorine gas. The assay process is as follows: 3.55 Gm. are suspended in water and the volume made up with water to exactly 100 Cc. 10 Cc. of the suspension are transferred to a flask and mixed with 20 Cc. of water in which previously 1 Gm. of potassium iodide has been dissolved. The liquid is then made acid with 20 drops of hydrochloric acid and the separated iodine titrated with tenth-normal sodium thiosulphate solution, of which not more than 25 Cc. should be used.

Calcium carbonatum precipitatum.—The test for nitrates with ferrous sulphate is given.

Calcium hypophosphorosum.—This preparation should contain 90 per cent. of absolute calcium hypophosphite. This is determined by the following method: .21 Gm. of calcium hypophosphite is dissolved in sufficient

water to make 100 Cc. 10 Cc. of this solution mixed with 9 Cc. of tenth-normal potassium permanganate solution should decolorize the permanganate solution after the addition of 10 Cc. of diluted sulphuric acid.

Camphora.—Only the natural product is official. The sp. gr. is given as .95, the melting point at 175° C. and the boiling point at 204° C.

Cannabis Indica.—When extracted with alcohol it should yield 8 per cent. of extractive matter.

Cantharides.—8 per cent. of ash is permitted.

Capsicum.—Should yield not more than 5 per cent. of ash.

Cera alba.—The acid number is given as 19 to 25 and the ester number as 68 to 75. The sp. gr. should be .966 to .970 and the melting point 64 to 65° C.

Cera flava.—Sp. gr. 0.962 to 0.966, melting point 63° to 64°, acid number 19 to 23, ester number 68 to 75. A very circumstantial method is given for the determination of the specific gravity.

Cetaceum.—The melting point is given as 47° C. The acid number should be not more than 1, and the iodine number between 6 and 7. 5 Gm. of cetaceum should be taken for the determination of the latter.

China succirubra cortex.—Only the red bark is official. The amount of total alkaloids should be at least 6 per cent. and the method for determining this is the same as recommended by Fromme and Keller, the alkaloids being titrated. The aqueous alcoholic liquid is then subjected to a qualitative test and for that purpose 20 Cc. are transferred to an evaporating dish, mixed with 10 Cc. of water, and evaporated on a water bath until 5 Cc. remain. 5 Cc. of water are added, and the mixture filtered through cotton into a cylinder and mixed with .5 Gm. of Rochelle salt. The mixture is then heated on a water bath for five minutes and allowed to cool. The crystals which separate are washed twice with 2 Cc. of water, then dissolved in 5 Cc. of water to which previously a few drops of diluted sulphuric acid have been added. To the fluorescent solution 2 Cc. of chlorine water are added and 0.5 Cc. of ammonia water, when a green color should be produced.

Chininum sulfuricum.—The pharmacopœia requires that the salt contain 8 molecules of water of crystallization.

For the detection of foreign cinchona alkaloids 1 Gm. of quinine sulphate previously dried at 100° C. is dissolved in a test-tube in 13 Cc. of hot distilled water and the test-tube then placed in a water-bath at exactly 15° C. and allowed to stand for two hours, maintaining exactly the same temperature. Then the liquid is filtered through a pledget of cotton and to the filtrate an equal volume of ammonia water is added, by which a clear solution should be obtained. This requirement is stricter than that given in the U. S. P. where for dissolving the precipitate of the alkaloids in 5 Cc. of the filtrate 7 Cc. of ammonia water are allowed. However, the requirements are not as strict as in the German Pharmacopœia in which only 4 Cc. of ammonia water are permitted.

Another test is given. If 0.445 Gm. is dissolved in 10 Cc. of water with the addition of a little hydrochloric acid, this solution boiled with 10 Cc. of tenth-normal barium chloride solution, the mixture filtered, and the filtrate divided in two portions, the addition of barium chloride solution or the addition of diluted sulphuric acid to the filtrate should produce at most a turbidity.

Chininum bisulfuricum.—For determining the foreign cinchona alkaloids 1 Gm. is dissolved in a test-tube by heating with 20 Cc. of water. After cooling sufficient normal potash is added to the solution until a slight turbidity is produced. The test-tube is then put into water of 15° C., and the test carried out as given under quinine sulphate. A test with barium chloride solution and diluted sulphuric acid similar to that given under quinine sulphate, is given for this salt also.

Chininum hydratum.—For the detection of foreign cinchona alkaloids .5 Gm. is dissolved in a slight excess of sulphuric acid, after the addition of 20 Cc. of hot water. Then the mixture is heated and sufficient normal sodium hydroxide solution is added while still hot, until a faint cloudiness is produced. The process is then carried out as given under quinine sulphate.

Chininum hydrochloricum.—To detect the foreign alkaloids, 1 Gm. of the quinine hydrochloride is dissolved in 20 Cc. of warm water, and to this a solution of .5 Gm. of crystallized sodium sulphate in 5 Cc. of water is added. The test-tube is then placed in water at 15° C. and the process carried out as given before. Another test for the purity of quinine hydrochloride is the following: .397 Gm. is dissolved in 10 Cc. of water containing a few drops of nitric acid, and to this solution 10 Cc. of tenth-normal silver nitrate solution are added. The liquid is then filtered and the filtrate divided in two portions. To the one silver nitrate and to the other hydrochloric acid is added. In neither case should more than a turbidity be produced.

Chininum ferri citricum.—The method for making this salt is given in detail.

If 1 Gm. of the salt be wetted with nitric acid, the mixture heated and incinerated, about 0.3 Gm. of iron oxide should be left.

For determining the quinine, of which the salt should contain about 9 to 10 per cent., 3 Gm. are dissolved in an Erlenmeyer flask in 12 Gm. of water. To this solution 60 Gm. of ether and 6 Cc. of ammonia water are added and the mixture shaken at intervals for five minutes and then allowed to stand. Then 40 Cc. of the ethereal solution, equal to 2 Gm. of the salt, are filtered into an exactly weighed Erlenmeyer flask, the ether evaporated and the residue dried at 100° C. This residue should be not less than .18 to .20 Gm.

Chininum tannicum insipidum.—A detailed process for making this preparation is given, as well as a method for determining the amount of quinine present and the estimation of foreign cinchona alkaloids.

Chloroform pro narcosi.—The sp. gr. of this preparation is 1.485 to 1.489, the boiling point from 60° to 62° C. 10 Cc. of the preparation when allowed to evaporate spontaneously in a porcelain dish should not leave a residue nor a foreign odor. On shaking with an equal volume of water it should not impart to the latter an acid reaction, nor should the aqueous layer be rendered turbid by the addition of solution of silver nitrate. When shaken with an aqueous solution of potassium iodide (1 to 1000) the chloroform should not acquire a pinkish tint. When shaken with an equal amount of concentrated sulphuric acid the latter should not be colored within one hour. It should be kept in a dark room in dark bottles of not more than 100 Gm. capacity.

Cocainum hydrochloricum.—The test for cinnamylcocaine is given as follows:—0.1 Gm. of the salt is dissolved in 5 Cc. of distilled water. To this 5 drops of concentrated sulphuric acid and two drops of tenth-normal potassium permanganate solution are added; the liquid should retain its pink color after standing for one hour.

.340 Gm. of salt dissolved in 10 Cc. of distilled water are mixed with 10 Cc. of tenth-normal silver nitrate solution after the addition of some nitric acid. The mixture is then shaken well, heated and the filtrate divided into two parts. Neither the addition of hydrochloric acid nor the addition of silver nitrate should produce more than a faint turbidity.

Codeinum hydrochloricum.—Of the codeine salts only the hydrochloride is official. The following test for purity is given: .372 Gm. of the salt is dissolved in 10 Cc. of distilled water and to the solution, acidulated with a few drops of nitric acid, 10 Cc. of tenth-normal silver nitrate solution are added. The mixture is then shaken, heated and filtered, and the filtrate divided in two parts. Neither hydrochloric acid nor silver nitrate should produce a precipitate in the filtrate.

In a solution of .1 Gm. of salt and 5 Cc. of water 5 drops of normal sodium hydroxide solution should not produce a precipitate even after standing for one hour.

Colchici semina.—No assay process is given for this drug; it is only required that when extracted with alcohol 10 per cent. of extractive matter should be obtained.

Collodium.—5 Gm. are evaporated in a porcelain dish at a temperature not exceeding 25° C. The residue after drying over calcium chloride should weigh not less than 0.2 Gm.

Colocynthis fructus.—Extracted with alcohol 30 per cent. of extractive matter should be obtained.

Colophonium.—When heated quickly the rosin should melt at 170° C. No determination of the acid number is given.

Decocta et infusa.—These are made by mixing the drug with the prescribed amount of cold distilled water and exposing this mixture to live steam in the case of infusion for five minutes. In the case of decoctions

for 30 minutes with frequent stirring. After cooling the liquors are filtered. Decoctions and infusions are supposed to be of 10 per cent. strength unless a stronger preparation is ordered by the physician. Both decoctions and infusions are to be made when prescribed and should never be kept in stock.

Digitalis folia.—The amount of extractive matter obtained by the extraction with alcohol should be 30 per cent.

Emplastra.—Plasters should be melted on a water-bath. Only resins which melt at a higher temperature are allowed to be melted over fire and are to be added to the balance of the plaster previously melted on a water-bath. Powders to be mixed with the plaster mass must be in a very fine state. The thickness of the plaster when spread should be 1 mm.

Emplastrum diachylon.—The following process is given for making this plaster: 500 Gm. of lead oxide are mixed in a roomy kettle with 500 Gm. of distilled water and to this 500 Gm. of lard and 500 Gm. of sesame oil are added. The mixture is then heated, replacing the water lost by evaporation, until the red color of the mixture turns to a yellowish white and until the mixture becomes sticky. The plaster is then washed with warm water and dried on a water-bath.

Emplastrum hydrargyri. This plaster is made with wool fat and diachylon ointment and should contain 20 per cent. of mercury.

Emplastrum saponatum.—This plaster also contains diachylon ointment as a base, and in addition to this white wax, camphor oil and 7 per cent. of dried medicinal soap.

Emulsio amygdalina.—This emulsion contains about 10 per cent. of sweet almonds and 5 per cent. of sugar. The acacia used in the U. S. P. is omitted.

Extracta.—The Hungarian pharmacopœia distinguishes dry, thick, semi-liquid and liquid extracts, the dry extracts containing from 5 per cent. to 6 per cent., the thick extract from 15 per cent. to 25 per cent., the semi-liquid from 25 per cent. to 40 per cent. and the liquid extracts from 65 per cent. to 85 per cent. of water.

For preparing the extracts only the best drugs should be used, and the maceration should be carried out at a temperature of 15° to 25° C.

For preparing the fluidextracts, first the weak percolate is evaporated at a temperature of 80° to 90° C. and the residue dissolved in the strong percolate. Ethereal percolates are to be evaporated at 35° C. on a water-bath. For preparing solid extracts the residue left after evaporation should be dried at a temperature not exceeding 50° C.

The percolation is carried out in an enameled or glass percolator, and in a manner similar to that prescribed in the U. S. P. taking 85 per cent. as reserve.

The determination of the moisture in the extract is carried out in the following way: 2 Gm. of the thick or semi-liquid extracts or 5 Gm. of the

liquid extracts are transferred to a glass dish with a flat bottom of $2\frac{1}{2}$ cm. depth and 5 cm. diameter covered with a watch glass, and then dried at 100° C. to constant weight.

Detection of metals in extracts.—The extract is incinerated in a crucible and the ash dissolved in 5 Cc. of dilute hydrochloric acid. When the mixture is filtered the filtrate should not show a turbidity on the addition of a solution of potassium acetate and hydrogen sulphide water.

The extracts should be kept at ordinary temperature in a dry place in well-closed containers protected from light.

Extractum aloes.—It is directed that the identification of this extract should be carried out by the test given under aloes.

Extractum Belladonnæ.—The extract is made by percolation with de-luted alcohol in the regular way. Among various tests given for the identification of this extract the following may be mentioned, depending on the methylesculetine which is present in belladonna but not in the other mydriatic drugs. 0.5 Gm. of the extract is dissolved in water applying a gentle heat and shaken out with ether. The ethereal liquid when shaken in a test-tube with 10 Cc. of water and one drop of ammonia water should acquire a bluish-green fluorescence. The extract should contain not more than 10 per cent. of water. The following assay process is given: 4 Gm. of the extract are heated in an Erlenmeyer flask of 200 Cc. capacity with 4 Cc. of water. The mixture is allowed to cool and 80 Gm. of ether and 4 Cc. of ammonia water are added. The mixture is then shaken well for ten minutes and after standing for $\frac{1}{4}$ hour, 60 Gm. of the ethereal solution are filtered into another Erlenmeyer, the ether evaporated and the residue treated twice with 5 Cc. of ether, which is evaporated each time. To the residue 30 Cc. of water saturated with ether are added and 10 Cc. of tenth-normal hydrochloric acid and the excess of acid titrated back in the usual way, using iodeosin as indicator. The amount of alkaloids is then calculated for dry extract as well as extract containing moisture, the latter being determined previously. No requirements for the amount of alkaloids present are made.

In addition to the quantitative determination a qualitative test depending on Vitali's reaction is given. An extract of belladonna containing dry dextrin is given also, which is made by dissolving the plain extract of belladonna in 100 parts of dilute alcohol, and adding to this such a quantity of dextrin, previously dried at 100° C., that on evaporation and drying an extract results which contains about 1 per cent. of total mydriatic alkaloids. The limit for the alkaloids present is from .91 to 1.06. This extract should be used for making pills, powders, solutions and suppositories and twice the quantity of extract prescribed should be used. In making plasters and ointments the strong regular extract of belladonna in the quantity prescribed should be used.

Extractum cannabis indicæ.—This extract is made with alcohol, adding dextrin to the finished product.

Extractum cascara sagradae fluidum.—This preparation should have a sp. gr. of 1.046 to 1.054 and should contain 25 per cent. of dry extract. The following identification test is given: .1 Gm. is dissolved in a small separator in 5 Cc. of water. To the solution 5 Cc. of ether are added and the mixture shaken occasionally *during one hour*. The ethereal solution is then transferred to a separator containing 1 Cc. of water and 1 Cc. of 10 per cent. ammonia water. On shaking, the ammoniacal liquid should assume a cherry-red color.

Extractum Chinæ fluidum.—This extract is made by macerating 500 Gm. of cinchona bark with 1500 Gm. of dilute alcohol, 40 Gm. of dilute hydrochloric acid and 50 Gm. of glycerin. The mixture is then transferred to a percolator and percolated with water in the usual way. The percolates are evaporated to 450 Cc. To the residue 50 Gm. of alcohol are added. By this process a clear transparent liquid is obtained with a sp. gr. of 1.130 to 1.160, which should contain 4 per cent. of total alkaloids, determined in the following way: Transfer 4 Gm. of the fluidextract to an Erlenmeyer flask of about 200 Cc. capacity, add to this 10 Cc. of water, 20 Gm. of chloroform, 60 Gm. of ether, and finally 5 Cc. of tenth-normal sodium hydroxide solution. The process is then carried out as given under cinchona. The thalleioquin reaction for identification is also prescribed.

Extractum Chinæ spissum.—This extract is made by percolating powdered cinchona bark with dilute alcohol. The extract should contain 12 per cent. of total alkaloids and is assayed in the following way: 1.25 Gm. are transferred to an Erlenmeyer flask of about 200 Cc. capacity and to this 50 Gm. of ether, 25 Gm. of chloroform, 5 Cc. of fifth-normal caustic potash and 10 Cc. of water are added. The mixture is shaken well for fifteen minutes and then allowed to stand for one-half hour. The ethereal liquid is then filtered through cotton and 60 Cc. transferred to another Erlenmeyer. The ether is evaporated and the residue treated once more with 5 Cc. of ether. The dry residue is then dissolved in 30 Cc. of alcohol, litmus solution added and then gradually tenth-normal hydrochloric acid until a red color is produced. 3.9 Cc. of hydrochloric acid should be used. With the liquid after neutralization the thalleioquin reaction is made.

Beside the last-mentioned reaction other identification tests are given for both the fluid and solid extract of cinchona.

Extractum cubebæ.—The oleoresin is made by extracting the powdered cubebs with a mixture of equal parts of ether and alcohol.

Extractum filicis.—The pharmacopœia directs that the malefern be extracted with ether, which in our opinion is much better than acetone, inasmuch as the latter is liable to extract substances which might produce injurious after-effects.

If .25 Gm. of the oleoresin is dissolved in 2 Cc. of ether and the solu-

tion shaken with 10 Cc. of lime water and the liquid filtered through a wetted filter, hydrochloric acid will produce an abundant white precipitate in the filtrate. The extract when viewed under a microscope should not show any starch.

Extractum gentianæ.—It is directed to macerate 1000 Gm. of the finely powdered gentian with 5000 Gm. of water, to strain and to macerate the marc again with 3000 Gm. of water. After standing for 12 hours the mixture is filtered again, and the marc pressed out well. The combined liquids are then evaporated on a water-bath until a weight of 2000 Gm. is obtained and this residue is mixed with 1000 Gm. of alcohol added in small portions. The alcoholic liquid is then filtered through and evaporated until 100 Gm. of the soft extract contains 75 to 80 Gm. of dry extract.

Extractum hydrastis fluidum.—It is directed to macerate the powdered golden seal with 500 Gm. of dilute alcohol and to exhaust the drug by percolation with dilute alcohol. The weak percolates are evaporated to 150 Gm. and the residue treated with 50 Gm. of alcohol. To this solution the reserve is added, the mixture stirred well and filtered.

An extract with the sp. gr. of .970 to .985 is thus obtained of which 100 Gm. contain 20 Gm. of dry extract. The extract should contain not less than 2 per cent. hydrastine which is determined by the following method: 12 Gm. of the extract are weighed into an Erlenmeyer flask of about 100 Cc. capacity and 20 Cc. of water are added. The mixture is then heated until the liquid is evaporated to about $\frac{1}{3}$ of its volume. To the residue 2 Cc. of diluted hydrochloric acid and sufficient water are added to make the total weight of the liquid 20 Gm. After the addition of 0.5 Gm. of talcum powder and thorough shaking the mixture is filtered through a small filter. 10 Gm. of the filtrate corresponding to 6 Gm. of the extract are transferred to another Erlenmeyer of about 150 Cc. capacity. 30 Gm. of ether and 5 Cc. of ammonia water are added and after shaking well for five minutes 30 Gm. of petroleum ether are added and the mixture shaken well again. The ethereal liquid is then filtered and 50 Gm. of the filtrate are evaporated until 10 to 11 Gm. are obtained. The remaining liquid is set in a cool place and after two hours the supernatant liquid is decanted from the crystals which have separated. The crystals are washed with 2 to 3 Gm. of petroleum ether and dried at 100° C. to a constant weight. This residue should amount to 1 Gm.

.02 Gm. of the residue are then dissolved in 10 Cc. of water containing a few drops of dilute sulphuric acid, and to this 2 drops of tenth-normal potassium permanganate solution are added and the mixture shaken until colorless liquid is obtained. After a few minutes the liquid will show a blue fluorescence.

Extractum hyoscyami (formula internationalis).—The extract should not contain more than 10 per cent. of water. No assay process is given

for this extract, but the following reaction is used for identification: Dissolve .75 Gm. of the extract in 5 Cc. of water in a bottle, add 15 Cc. of ether and .3 Gm. of calcium carbonate. (Should probably read *sodium* carbonate. E.) Shake well for five minutes, then add 3 Gm. of dry sodium sulphate and shake again for ten minutes. Allow to clear and decant 5 Cc. of the clear ethereal liquid into a porcelain dish. Add to this 3 Cc. of water and evaporate off the ether on a water bath. The aqueous liquid is filtered through a pledget of cotton into another dish, evaporated to dryness and to the residue Vitali's reaction is applied. To the balance of the ethereal solution not used for this test add one drop of dilute sulphuric acid and 3 Cc. of water. Then evaporate off the ether, filter the aqueous liquid through a pledget of cotton into another test-tube and add to this solution Wagner's reagent, which should produce a reddish-brown precipitate. In addition to this extract the pharmacopœia has an extract diluted with dextrin.

Extractum kola fluidum.—As this extract is not official in the U. S. P., it is not necessary to give a process for making it as outlined in the Hungarian Pharmacopœia. The extract, which is required to contain 1 per cent. of caffeine, is assayed by the following method: Exactly 12 Gm. of the extract are weighed into an Erlenmeyer flask of about 100 Cc. capacity and heated until two-thirds of its volume are lost. The liquid is then allowed to cool and 10 Cc. of water in small portions, 60 Gm. of chloroform and 3 Cc. of ammonia water are added. The mixture is shaken well for one-half hour and allowed to stand for one-half hour. 50 Gm. of the chloroform liquid are taken off with a pipette and transferred to another Erlenmeyer. To this chloroform extract 20 Cc. of $\frac{1}{2}$ per cent. hydrochloric acid are added and the chloroform evaporated. The aqueous liquid is then filtered into a separator and shaken with 20, 15, 10 and 5 Cc. of chloroform. The combined chloroformic solutions are filtered and collected in a weighed Erlenmeyer, the chloroform distilled off and the residue dried to a constant weight. 0.1 Gm. should be obtained and identified as caffeine with chlorine water and ammonia. (It is difficult to understand why the acid liquid is not made alkaline with ammonia. By not doing so the basic theobromine is not determined. E.)

Extractum liquiritiæ.—100 Gm. of powdered licorice are macerated for one day with 4000 Gm. of distilled water, filtered, the marc pressed out well and macerated again with 2000 Gm. of distilled water for two hours. The mixture is then filtered, the marc pressed out again and the combined aqueous liquids evaporated on a water-bath until 2000 Gm. of liquid are obtained. The liquid is allowed to cool and 1000 Gm. of alcohol are added, the mixture shaken well, filtered and the liquid evaporated on a water-bath until 100 parts of the soft extract contain 60 to 65 parts of dry extract.

Extractum malatis ferri. This preparation which is official in the N.

F., is prepared by adding to the juice of 1000 Gm. of sour apples, 20 Gm. of powdered iron, and heating the mixture on a water-bath until the evolution of hydrogen has ceased. After the addition of 500 Gm. of water the mixture is allowed to cool and is strained. The solution is then filtered through paper and evaporated on a water-bath to a soft extract. 100 parts of this extract should contain 3 parts of iron which is determined in the following way: Exactly 2 Gm. of the extract are evaporated to dryness in a porcelain crucible. The residue is then incinerated, moistened with 5 to 6 drops of nitric acid, and heated again to red heat. Then 5 Cc. of concentrated hydrochloric acid are added, the mixture heated, and after solution has taken place transferred to a bottle. 50 Cc. of water and 2 Gm. of potassium bicarbonate are next added. The latter is dissolved by shaking and then 4 Gm. of potassium iodide are added. The bottle is shaken again at intervals until the effervescence has ceased and allowed to stand *for twenty hours*. For decolorizing the iodine liberated from the potassium iodide about 10.8 Cc. of sodium thiosulphate solution should be used.

Extractum nucis vomice.—(Formula internationalis.) This extract which is made with dilute alcohol should contain when dry 16 per cent. of total alkaloids. It is assayed in the following way: Weigh into an Erlenmeyer of about 200 Cc. capacity 1.25 Gm. of the extract and dissolve it with gentle heating in 10 Cc. of water. To the cold liquid add 50 Gm. of ether, 25 Gm. of chloroform and 3 Cc. of ammonia water. Then shake well for $\frac{1}{4}$ hour, and allow to stand and clear. Of the ethereal liquid filter 60 Gm. (equal to 1 Gm. of extract) into an Erlenmeyer of about 200 Cc. capacity, evaporate off the menstruum used and titrate in the usual way, with tenth-normal acid and tenth-normal sodium hydroxide.

With the ethereal liquid which is not used for the estimation identification reactions for strychnine and brucine are made.

Extractum opii.—(Formula internationalis.) For the preparation only water is used. The assay process for this extract is the well-known Helfenberg process.

Extractum rhei.—The following identification process is given: .05 Gm. of the extract is dissolved in a small separatory funnel in 5 Cc. of water and the solution then tested in the way given under extract *cascara sagrada*.

Extractum ratanhia.—This extract is made with water only. For the identification of this extract .25 Gm. are dissolved in hot water, the solution cooled and 5 Cc. of alcohol are added, whereby a clear solution will result. Two Cc. of this solution are diluted with 20 Cc. of water and divided into two parts. To the one portion one drop of iron chloride solution is added, whereupon *a yellow flocculent precipitate will separate*. To the other one drop of ammonia is added, by which a reddish color will be produced.

Extractum scillæ.—This extract is not made with acetic acid as directed in the U. S. P.

Extractum secalis cornuti spissum.—This extract is made in the following way: 1000 Gm. of ergot are macerated for twelve hours with 2000 Gm. of chloroform water. The mixture is strained and the marc pressed out well. The latter is then macerated again for six hours with 2000 Gm. more of chloroform water and the mixture strained again, etc. The combined aqueous solutions are evaporated on a water bath to 500 Gm. and to this 400 Gm. of alcohol are added. The mixture is shaken well occasionally during one hour, filtered through filter paper and evaporated on a water bath until 165 Gm. of the residue are obtained. By this way an extract results of which 1 Gm. is perfectly soluble in 5 Cc. of water. This mixture should not be rendered turbid by the addition of 5 Cc. of alcohol. The aqueous solution has an acid reaction. .5 Gm. of the extract is dissolved in 5 Cc. of water in a small separatory funnel, and to this solution 10 Cc. of ether and sufficient ammonia water is added to produce an alkaline reaction. This mixture is then shaken and, after clearing, the ethereal liquid is filtered into a porcelain dish and the ether evaporated off on a water bath. The residue is dissolved in 3 Cc. of glacial acetic acid, transferred to a test-tube, one drop of normal iron chloride solution is added and the liquid underlaid with concentrated sulphuric acid, when at the zone of contact a blue ring should appear. One part of the extract represents six parts of ergot.

Besides this extract the pharmacopœia recognizes an extract which is mixed with dextrin in such a quantity that two parts of the extract contain one part of dry extract.

Extractum secalis cornuti fluidum.—The fluidextract of ergot is prepared by mixing 500 Gm. of powdered ergot with 25 Gm. of glycerin and 275 Gm. of alcoholic cinnamon water. The mixture is then transferred to a percolator and the ergot exhausted with a mixture of 20 parts of alcohol (by weight) and 80 parts of water. The percolation is carried out in the usual way, keeping 425 Gm. as reserve, evaporating the weaker percolates on a water-bath to 75 Gm. and dissolving the residue in the reserve. After settling, the fluidextract is filtered through filter paper. By this way a preparation is obtained with a slight acid reaction and a sp. gr. of 1.07 to 1.08.

3 Gm. of the extract are mixed in a porcelain bowl with 7 Gm. of water and the mixture evaporated until 5 Gm. of the residue are obtained. The cold liquid is then transferred to a separator and the test for cornutine made as given under extract ergot.

Ferrum hydrogenio reductum.—Dissolved in hydrochloric acid it should not leave more than 1 per cent. of insoluble matter. A test for the absence of cyanides is given and it is also required that the gas produced by the action of the sulphuric acid on the iron should not produce any

change when conducted into silver nitrate solution in the latter within 5 minutes. The reduced iron should be 80 per cent. pure but no proper assay is given. If 1 Gm. of the iron is heated for fifteen minutes the resulting oxide should weigh 1.34 Gm.

Ferrum lacticum.—The following process is given for determining the percentage: If 1 Gm. of the iron lactate be moistened with concentrated sulphuric acid in a porcelain crucible, and the mixture dried and ignited, about .27 Gm. of iron oxide should be obtained.

Ferrum pulveratum.—Should contain not more than 1 per cent. of matter insoluble in hydrochloric acid.

Ferrum sesquichloratum crystallisatum.—The following test is given for ferrous salt: If 1 Gm. of the iron chloride be dissolved in 100 Cc. of water and this solution be acidulated with 20 Cc. of hydrochloric acid not more than 5 Cc. of tenth-normal permanganate solution should be used to produce a persistent red color. No assay process is given.

Ferrum sesquichloratum solutum.—This solution should have a sp. gr. of 1.28 to 1.283 and should contain about 10 per cent. of iron.

Filicis Maris rhizoma.—Should yield 8 per cent. of extractive matter when exhausted with ether.

Formaldehydum solutum. (*Formalin.*)—This preparation should have a sp. gr. of 1.077 to 1.081 and should contain about 35 per cent. of absolute formaldehyde. A mixture of 2 Cc. of formaldehyde solution and 1 Cc. of tenth-normal sodium hydroxide solution should not show an acid reaction. For the determination of the percentage the iodometric method is used, which is carried out as follows: 1.5 Gm. of the formaldehyde solution are diluted with water to measure 100 Cc. and of this solution 5 Cc. are mixed with 50 Cc. of tenth-normal acid potassium iodate solution, 2 Gm. of potassium iodide and 5 Cc. of hydrochloric acid. The liquids are mixed well and, after the addition of about 5 Cc. of caustic soda, allowed to stand for 10 minutes. The mixture is then acidulated with 10 Cc. of hydrochloric acid and the separated iodine titrated with tenth-normal thiosulphate solution. For retitration 32 to 33 Cc. of the latter solution should be used.

Guarana.—Guarana should contain 4 per cent. of caffeine. The assay process is as follows: 6 Gm. of guarana, previously dried at 100° C., are mixed in an Erlenmeyer flask with 120 Gm. of chloroform and 6 Cc. of ammonia water, and after shaking well for some hours, the chloroformic liquid is filtered. 100 Gm. of the filtrate are then evaporated and to the residue 3 Cc. of alcohol are added. The solution is evaporated again, the residue dissolved in a mixture of alcohol and water (3 to 7) and after adding 20 Cc. of water the solution is filtered into a tared beaker and evaporated to dryness. The white crystalline residue should weigh 0.2 Gm.

Gummi Arabicum.—Should yield not more than 5 per cent. of ash.

Hydrargyrum bichloratum corrosivum.—The following test is given for this chemical: 1.36 Gm. of corrosive sublimate are dissolved in 50 Cc. of warm water and saturated hydrogen sulphide water is added. The resulting precipitate is then filtered and washed with 50 Cc. of water. The filtrate is boiled and after cooling, 2 to 3 drops of methyl orange solution are added. 9.9 to 10.1 Cc. of normal potassium hydroxide should be used for neutralizing this liquid. The precipitate produced by the hydrogen sulphide water is tested for arsenic in the regular way.

Hydrastis Canadensis radix.—No assay process is given.

Hyoscyami folia.—No assay process is given, the only requirement being that the leaf should yield on extracting with alcohol 18 per cent. of extractive matter.

Ipecacuanhæ radix.—It is required that the root should contain 2 per cent. of total alkaloids, which are determined in the following way: 5 Gm. of the powdered ipecac are mixed in an Erlenmeyer flask with 75 Gm. of ether, and shaken occasionally during $\frac{1}{4}$ hour. Then 4 Cc. of ammonia water are added, the mixture shaken again for $\frac{1}{4}$ hour and allowed to stand for $\frac{1}{2}$ hour, after which 60 Gm. of the ethereal liquid are filtered into an Erlenmeyer flask and the ether evaporated. The residue is twice treated with 5 Cc. of ether which is evaporated each time. Then 30 Cc. of water saturated with ether are added and 10 Cc. of tenth-normal hydrochloric acid. After solution has taken place 90 Cc. of water are added and a few drops of iodeosin and the excess of acid titrated back in the usual way.

Jalapæ radix.—The jalap should contain 8 per cent. of resin, which is to be determined by extracting the root with alcohol and purifying the resulting resin by treating it with hot and cold water.

Iodum.—Should be 99 per cent. pure and free from iron.

Kalum bromatum.—The following test is given for purity: 1.19 Gm. are dissolved in sufficient water to make 100 Cc. To 20 Cc. of this solution a few drops of nitric acid and 20 Cc. of tenth-normal silver nitrate solution are added and the mixture filtered. The filtrate should not produce more than a turbidity, either by the addition of hydrochloric acid or by the addition of silver nitrate solution.

Kalum carbonicum purum.—The following test is given to determine the purity of this salt: The salt is heated to a red heat, and after cooling in a dessicator, 1.38 Gm. are dissolved in 10 Cc. of distilled water. After the addition of one or two drops of methyl orange the solution is neutralized with normal hydrochloric acid, of which 19.8 Cc. should be used.

Kalum chloricum.—The test for nitrates is made with zinc and iron and not with aluminum, as directed in the U. S. P.

Kalum hydrocarbonicum.—5 Gm. heated in a crucible should leave 3.44 to 3.45 Gm. of residue.

Kalium hydroxidatum.—Should contain 80 per cent. of absolute potassium hydroxide.

Kalium hypermanganicum.—The purity is determined by the iodometric method and should be 99.5 per cent.

Kalium hypophosphorosum.—Should contain 90 per cent. of absolute potassium hypophosphite, which is determined in the following way: .26 Gm. of the salts are dissolved in sufficient water to produce 100 Cc. of solution and 10 Cc. of the solution are mixed with 9 Cc. of tenth-normal potassium permanganate and then with 10 Cc. of sulphuric acid. The potassium permanganate should be decolorized.

Kalium iodatum.—The following purity test is given: If 1.66 Gm. are dissolved in sufficient water to make 100 Cc. and 20 Cc. of this solution be mixed with 20 Cc. of tenth-normal silver nitrate solution, after adding a few drops of nitric acid and filtering it should yield a filtrate in which no turbidity is produced either by the addition of hydrochloric acid or by the addition of silver nitrate solution.

Kalium stibio tartaricum.—The following purity test is given: 3.32 Gm. are dissolved in sufficient water to make 100 Cc. of solution. To 10 Cc. of this solution, 20 Cc. of hydrochloric acid, a few drops of methyl orange and 10 Cc. of tenth-normal bromine solution are added at once and then drop by drop sufficient of the same solution until the reddish-blue color changes to lemon yellow. 19.8 to 20 Cc. should be used.

Kola Semina.—No assay process is given.

Kreosotum.—The sp. gr. is given as 1.08 to 1.09 and the boiling point from 200° to 220° C. It should not become solid even when cooled to -20° C.

Linimentum saponato camphoratum.—The following process is given for making this liniment: 50 Gm. of powdered soap are dissolved with the aid of heat in 70 Gm. of water, and to this 820 Gm. of alcohol are added and the mixture heated on a water-bath with frequent stirring until the soap is perfectly dissolved. Then 25 Gm. each of camphor and ammonia water, 5 Gm. each of oil of lavender and oil of rosemary are added, and sufficient alcohol to make the total weigh 100 Gm. The mixture is then filtered.

Liquor ferri albuminati.—120 Gm. of iron oxychloride solution are mixed with 3380 Gm. of water previously heated to 50° C., and to this is added a filtered solution of 240 Gm. of fresh egg albumen in 3250 Gm. of water, also heated to 40° C. The precipitate thus produced is allowed to settle and the supernatant liquid decanted. After washing with 3500 Gm. of water of 40° C. the precipitate is transferred to a strainer and allowed to strain until 500 Gm. of iron albuminate are obtained. This is then dissolved in 20 Cc. of normal sodium hydroxide solution and to the resulting solution 100 Gm. of alcoholic cinnamon water, 2 Gm. of aromatic tincture, 50 Gm. of alcohol and sufficient water are added to produce

a total weight of 1000 Gm. By this process a red, limpid liquid is obtained, free from the taste of iron and miscible with alcohol. It should contain 0.4 per cent. of metallic iron, which is determined iodometrically as given under *Extractum malatis ferri*.

Liquor ferri oxychlorati.—This preparation, for which a detailed process for making it is given, should contain $3\frac{1}{2}$ per cent. of metallic iron, which is determined iodometrically by a method similar to that given under iron salts.

Liquor hydrogenii hyperoxidati concentratissimus.—Only a preparation containing 30 per cent. of absolute peroxide of hydrogen is recognized. This mixture should not give a reaction with sulphuric acid nor with calcium chloride, after being made alkaline with ammonia. It is to be kept in bottles which are covered inside with paraffin. The quantitative determination is the same as that given in U. S. P. with potassium permanganate solution. In a foot note it is directed that when ordinary peroxide of hydrogen is prescribed, a 3 per cent. solution should be made from the stronger solution.

Lithium carbonicum.—The purity for this chemical is 99 per cent.

Lobelia herba.—When extracted with diluted alcohol it should yield about 18 per cent. of extractive matter.

Magnesium oxidatum.—10 Gm. heated to redness in a crucible should lose not more than 1 Gm.

Mel.—A mixture of one part of honey and 20 parts of water should have a sp. gr. of 1.111. 10 Gm. of the honey dissolved in 20 Cc. of water should not require more than 4 Cc. of normal sodium hydroxide solution for neutralization, phenolphthalein being used as indicator.

Morphine and its salts.—Only morphine hydrochloride is official.

Natrium boricum.—1.91 Gm. of borax dissolved in water should require 9.9 to 10.1 Cc. of normal acid for neutralization.

Natrium bromatum.—The test for purity is similar to that given under *Kalium bromatum*.

Natrium carbonicum cryst.—The purity should be at least 99 per cent.

Natrium hydroxydatum.—Should contain 90 per cent. of absolute sodium hydroxide. The test for purity is carried out in the following way: 4.01 Gm. are dissolved in sufficient water to make 100 Cc. To 20 Cc. of this solution 15 Cc. of barium chloride solution are added, and a few drops of phenolphthalein solution, and then sufficient normal hydrochloric acid to discharge the red color. 18 Cc. of acid should be used.

Natrium hypophosphorosum.—This salt should contain 90 per cent. of hypophosphite. The determination is carried out in a manner similar to that given under potassium hypophosphite.

Natrium salicylicum.—1 Gm. of the salt on incineration should yield .33 to .34 Gm. of residue.

Nitroglycerinum spiritui solutum.—The quantitative determination of this

solution is carried out by adding to 7.57 Gm. of the nitroglycerin solution 20 Cc. of tenth-normal hydroxide solution free from carbonates. After the addition of phenolphthalein, the excess of the alkali is titrated back with tenth-normal acid, of which 9.05 (should probably read 9.5 Cc. E.) to 10.5 Cc. should be used representing about 1 per cent. of nitroglycerin in the solution.

Nucis v æ semina.—Should contain $1\frac{1}{2}$ per cent. of total alkaloids, which are determined in the following way: To 5 Gm. of the powdered drug 25 Gm. of chloroform and 50 Gm. of ether are added, and after allowing to macerate for one-half hour 4 Cc. of ammonia water are added. The mixture is shaken well during one quarter of an hour. After allowing to stand for one hour the ether-chloroform mixture is filtered and 60 Cc., equal to 4 Gm. of the drug, are transferred to another Erlenmeyer of 200 Cc. capacity. The process is then carried out as given under ipecac.

Oleum amygdalarum dulcium.—The acid number for this oil should be less than 3, and the iodine number 94 to 96. 0.7 Gm. are taken for determining the latter.

Oleum camphoratum.—For this oil and for

Oleum chloroformatum sesame oil is used.

Oleum cinnamomi cassiæ.—The oil as distilled from the leaves of Cinnamum Cassiæ is official. The sp. gr. is given at 1.055 to 1.065.

Oleum jecoris aselli.—The sp. gr. is given as .920 to .930. The acid number should be less than 2, and the iodine number, for the determination of which 4 Gm. are taken, should be between 150 and 155.

Oleum lini.—The acid number should be less than 2, the iodine number, for the determination of which 0.3 Gm. are taken, should be between 170 and 180.

Oleum phosphoratum.—This preparation is made in the following manner: 94.5 Gm. of oil of sweet almonds are mixed with 10 Gm. of dry sodium sulphate and heated on a water bath for one-half hour with frequent stirring. Then the mixture is allowed to cool to a temperature below the melting point of phosphorus and 0.5 Gm. of dry phosphorus is added and mixed well until the odor of phosphorus has disappeared. To this solution 5 Gm. of alcohol are added, by which a limpid and transparent yellowish oil is obtained. 2 Gm. of phosphorized oil should contain .01 Gm. of phosphorus.

Oleum pini sylvestris pro inhalatione.—It is interesting to note that this oil, which is used considerably for inhaling purposes, is official in the pharmacopœia. The sp. gr. is given as .853 to .870. It should be perfectly soluble in ether and twice its volume of alcohol.

Oleum sinapis ætherium.—No assay process is given.

Opium.—Opium dried at 60° C. should contain 10 per cent. of morphine. This is determined in the following way: The opium is first freed from the poppy leaves and the seeds of the various species of *rux*

with which the gum opium is usually covered and dried at 60° C. 6 Gm. of the dried powdered opium are then transferred to a porcelain dish and stirred with 10 Cc. of distilled water to a uniform mixture. This mixture is then transferred to a tared Erlenmeyer with sufficient water to make the solution weigh 54 Gm., and this mixture is shaken well for one-fourth hour. 42 Cc. of the aqueous liquid are filtered through a filter of 8 Cm. diameter into a cylinder, mixed by gentle rotation with 2 Cc. of normal ammonia water and the process then finished as given in the Helfenberg method. Opium which contains more than 10 per cent. should be mixed with sufficient milk sugar to reduce the strength to 10 per cent. of morphine.

Pastilli (tablets).—Tablets should not weigh more than 1 Gm. They should be prepared by compressing the powder or granulated material; they should be easily friable between the fingers, and should also be easily soluble in warm water. As lubricants, talcum powder, cacao powder or paraffin are allowed.

Only two kinds of tablets are described, nitroglycerin tablets, of which each tablet should contain .0005 Gm. of nitroglycerin, and santonin tablets, of which each tablet should contain .125 Gm. of santonin. Both the tablets are prepared with milk sugar and powdered cacao.

Pepsinum.—The proteolytic power is determined in the following way: A hen's egg is cooked for five minutes and the coagulated albumin disintegrated through a No. 4 sieve. (No. 25 U. S. P.) 10 Gm. of the disintegrated albumin are transferred to a cylinder and mixed with 95 Cc. of water at 50° C. and 2 Cc. of hydrochloric acid. The mixture is then shaken well and .1 Gm. of pepsin, dissolved in 3 Cc. of luke-warm water, is added. The mixture is then kept in a water bath at 40° C. and shaken every ten minutes; the albumin, with the exception of a few particles of membrane, should be dissolved within one hour. This would correspond to a pepsin 1.600, which requirement is considerably less than that of the U. S. P.

Pilulæ.—Pills for internal use should have a weight of from .1 to .3 Gm. and when cut in half and shaken with luke-warm water should disintegrate or dissolve within a short time. For making pills the following details are given:

The pill mass should be perfectly uniform and kneadable.

As binders and diluents various substances are given, the former including extract licorice, water, alcohol, glycerin, simple syrup, acacia, and the latter comprising powdered licorice root, powdered marshmallow root, sugar and milk sugar.

Pills which contain silver nitrate, mercury preparations or similar substances which act on organic matter are to be made with bolus and glycerin.

Pills containing balsams should be made by mixing the mass with wax.

The pills should be rolled in powdered licorice root.

Pilula ferri carbonici.—The following formula is given for Blaud's pills: 30 Gm. of pure potassium carbonate are mixed in a mortar with 30 Gm. of powdered sugar, then with 60 Gm. of finely powdered crystallized ferrous sulphate, and to the mixture 4 to 5 Gm. of pure honey are added, and mixed well again. Of this mass 500 pills should be made each of which contains .05 Gm. of ferrous carbonate.

Plumbum acetikum basicum solution.—No assay process is given. Sp. gr. should be 1.23 to 1.24.

Pilula laxantes.—These are made from powdered aloes, powdered jalap root and powdered medicinal soap, and are flavored with oil of anise.

Podophylli resina.—One part of resin should be soluble in 100 parts of ammonia water, and water added to this solution should not produce a turbidity.

Potio magnesiæ citricæ effervescens.—8 Gm. of magnesium carbonate are mixed with 300 Gm. of distilled water and to the mixture 14.5 Gm. of crystallized citric acid are added. After the effervescence has ceased 40 Gm. of simple syrup, 1 drop of lemon oil and 3 Gm. of sodium bicarbonate are added and the mixture filled in strong bottles.

This mixture contains 12 Gm. of magnesium citrate and 3 Gm. of sodium citrate.

Powders.—Only the best materials should be used.

Grind the material to a coarse powder and dry at a temperature not exceeding 60° C. If the ingredients contain volatile substances the temperature should not exceed 30° C. The duration of the heating depends on the nature of the material and the amount of it. Musk, castoreum, crocus, digitalis leaves, ergot and malefern are to be dried and kept over calcium oxide and should be powdered only when used.

The materials should be powdered if possible without leaving a residue. The finished powders are dried again and kept in well-closed containers. The vegetable powders are to be renewed every year and the powders containing aromatic substances should be made only when used.

Pulvis liquiritiæ compositus. The powder contains 1 Gm. of oil of anise, 40 Gm. of powdered sugar, 10 Gm. of washed sulphur, 20 Gm. of powdered licorice, and 20 Gm. of powdered senna leaves.

Punica granati cortex.—The following test is given for determining the proper amount of alkaloids present in the drug. Add to 4 Gm. of the finely powdered drug 20 Cc. of ether, shake for a few minutes and then add 2 Cc. of water and 2 Cc. of fifth-normal sodium hydroxide solution. Mix thoroughly by shaking for one minute and allow to stand for one-quarter hour, then filter the ethereal liquid into a porcelain dish containing about 5 Cc. of water acidulated with hydrochloric acid. Evaporate off the ether, filter the acid liquid and add to the filtrate 1 to 2 drops of Wagner's reagent, by which a reddish precipitate should be produced.

Rhatania radix.—By extraction with hot water 9 per cent. of extractive matter should be obtained. The alcoholic extract mixed with a solution of lead acetate should give a red-colored precipitate. The filtrate from this should possess a red color also.

Resina elastica.—The following test for the purity of caoutchouc is given : 0.5 Gm. of the rubber cut in small pieces is dissolved in 25 Cc. of petroleum ether with frequent shaking and the mixture allowed to stand for 12 hours. The mixture is then filtered into a tared Erlenmeyer and the insoluble matter washed twice with 5 Cc. of petroleum ether. To the solution in the Erlenmeyer 40 to 50 Cc. of absolute alcohol are added. The alcoholic liquid is then decanted from the precipitate and the latter washed with 5 Cc. of absolute alcohol. Flask and precipitate are then dried on a water bath to a constant weight. 0.42 to 0.43 Gm. of pure rubber should be obtained.

Resina jalapa.—Should contain no more than 10 per cent. of ether-soluble resin. 0.2 Gm. of resin jalap dissolved in 2 Cc. of acetic acid should not be colored red or green by the addition of 1 Cc. of concentrated sulphuric acid.

Resorcinum.—The melting point is given 100° to 111° C.

Saccharinum.—The following test for purity is given. Dissolve 0.366 Gm. in 20 Cc. of hot distilled water and after the addition of a few drops of phenolphthalein in solution add sufficient tenth-normal sodium hydroxide solution free from carbonates, until a pink color is produced. 19.6 to 20 Cc. of the latter should be used.

Saccharum lactis.—The test for cane sugar is the same as that in the U. S. P., i. e. treating the milk sugar with dilute alcohol.

Sal carolinum factitium.—This salt contains 220 Gm. of sodium sulphate, 10 Gm. of potassium sulphate, 90 Gm. of sodium chloride, and 180 Gm. of sodium bicarbonate.

Sapo Kalinus and *Sapo medicinalis* are made with sesame oil.

Scopolaminum hydrobromicum.—This salt should melt at about 190° C. An aqueous solution should not be rendered turbid by the addition of ammonia water.

Secale cornutum.—Ergot should yield 16 per cent. of extractive matter when exhausted with alcohol.

Spiritus camphoratus.—The following test is given : 10 Cc. of the spirit of camphor are shaken in a test-tube with 10 Cc. of a solution of calcium chloride and 4 Cc. of petroleum ether : the volume of the latter should be increased to 5 Cc. The sp. gr. is given as .896 to .898.

Spiritus concentratissimus.—Should contain 94.1 to 96 per cent of absolute alcohol by volume. Among the tests the following is given : If 10 Cc. of alcohol are mixed with 0.5 Cc. of tenth-normal potassium permanganate solution the red color should not be discharged within 10 minutes.

Spiritus dilutus.—Should contain 69.8 to 70.2 per cent. of absolute alcohol by volume.

Strophanthi semina.—When extracted with alcohol strophanthus should yield 12 per cent. of extractive matter. Only the Kombé seeds are official.

Strychninum.—Of the strychnine salts, only strychnine nitrate is official.

Suppositoria.—Should be made with oil of theobroma or when other fatty oils, glyco-gelatin or stearin-soap. They may be formed by hand or made in moulds. Ordinary suppositories should be 3 to 4 cm. long and should have a diameter at the wider part of 1 cm. The thickness of urethral suppositories should be 2 to 3 Mm.

Syrups.—Syrups should be prepared by gently heating the sugar with the prescribed amount of the other ingredients.

Concentrated syrup is prepared by heating sugar and water for a short time, until a clear solution is obtained, replacing any water lost by evaporation.

Syrups containing vegetable extracts or fruit juice should be pasteurized.

Syrupus ferri iodati.—To 25 Gm. of powdered iron suspended in 50 Cc. of cold water 8.2 Gm. of iodine are gradually added. When the color of the latter has disappeared, the solution is filtered into a porcelain dish containing 125 Gm. of sugar and 0.2 Gm. of citric acid and the filter is washed with sufficient water to obtain 200 Gm. of total filtrate. The mixture is then heated to dissolve the sugar and any water lost by evaporation is replaced. The following test for this syrup is given: 15.5 Gm. of the syrup are dissolved in sufficient water to make 100 Cc. of solution. To 20 Cc. of this 10 Cc. of tenth-normal silver nitrate solution and a few drops of nitric acid are added, and the mixture filtered. In the filtrate either silver nitrate or hydrochloric acid should produce no more than a faint turbidity.

Syrupus hypophosphitum comp.—Contains 15 Gm. of calcium hypophosphite, 10 Gm. each of potassium hypophosphite and sodium hypophosphite, 5 Gm. each of iron lactate and citric acid, 2 Gm. each of manganese chloride and quinine hydrochloride, 550 Gm. of sugar and 15 Gm. of tincture of nux vomica and q. s. water in 1000 Gm.

Tinctures.—Tinctures are to be prepared by maceration and percolation generally in the proportions of 1 part of the drug to 10 parts of the menstruum, as adopted by the Brussels conference, 1902. Stronger tinctures (20 per cent.) of indifferent drugs are allowed also.

Tincture aloes.—Should contain 9 per cent. of extractive matter.

Tincture belladonnae. (Formula internationalis).—Should contain 2½ per cent. of extractive matter. The following test is given: 10 Cc. are evaporated and the residue mixed with 10 Cc. of cold water. The mixture is then filtered and the filtrate is divided into two parts. With one part of the filtrate Vitali's reaction is made in the usual way, while in the other the presence of methylesculetine is proven.

Tinctura Chinae.—Should contain 5½ per cent. of extractive matter. No assay process is given.

Tinctura colchici. (Formula internationalis.)—Should contain 3 per cent. of extractive matter. The following test is given: Evaporate 10 Cc. of the tincture to dryness, take up the residue in 5 Cc. of chloroform and 10 drops of ammonia water, and shake well for two minutes. Filter the chloroformic liquid into a porcelain dish, evaporate to dryness, take up the residue in 5 drops of concentrated sulphuric acid and add a few crystals of potassium nitrate. A bluish-green color changing to violet-red should be produced.

Tinctura digitalis. (Formula internationalis.)—Should contain $3\frac{1}{2}$ per cent. of extractive matter. The following test is given: 10 Cc. are evaporated to dryness and the residue taken up in 10 Cc. of distilled water, mixed well with 5 drops of basic lead acetate solution and the mixture filtered. To the filtrate 10 Cc. of chloroform are added and the mixture shaken well for two minutes. The clear chloroformic liquid is then evaporated on a water bath to dryness, the residue dissolved in 3 Cc. of glacial acetic acid, to which one drop of one-half-normal iron chloride solution has been added and the mixture then underlaid with 2 Cc. of concentrated sulphuric acid. A blue ring should be produced at the zone of contact.

Tinctura ipecacuanha (Formula internationalis.)—Should contain 2 per cent. of total alkaloids, which are determined in the following way: 32 Gm. of the tincture ipecac are evaporated in an Erlenmeyer until 10 Gm. are obtained. To the cold residue 60 Gm. of ether and $2\frac{1}{2}$ Cc. of ammonia water are added and the mixture shaken well for one-fourth hour. After allowing to stand for one-half hour, 45 Cc., equal to 2 Gm. of the tincture, are filtered and evaporated in an Erlenmeyer. The process is then carried out in the usual way.

Tinctura malatis ferri.—Should contain .5 per cent. of iron, which is determined iodometrically.

Tinctura nucis vomica.—Should contain .25 per cent. of total alkaloids, which are determined by a process similar to that given under *nux vomica*.

Tinctura opii.—Should contain 1 per cent. of morphine, which is determined by evaporating 50 Gm. of the tincture in a porcelain bowl until 15 Gm. are obtained. To the residue sufficient water is added to produce 38 Gm. Then 2 Gm. of normal ammonia water are added, the mixture rotated and 32 Gm., equal to 40 Gm. of the tincture, are transferred to an Erlenmeyer, and the morphine determined by the Helfenberg process.

Tinctura opii crocata.—Should contain 1 per cent. of morphine, and is assayed in a way similar to that for the tincture opium.

Tincture strophanthi.—Should contain 2 per cent. of extractive matter and should answer the following test: If one drop of the tincture be evaporated in a porcelain dish and to the dry residue 4 drops of 8 per cent.

sulphuric acid and two drops of water are added, a green color will be produced.

Tinctura veratri.—Should contain 1.6 per cent of extractive matter and answer the following test: 10 Gm. of the tincture are evaporated on a water-bath with the addition of three drops of dilute hydrochloric acid until 3 Gm. are obtained. To this residue 7 Cc. of water are added, the mixture filtered into a separatory funnel, 5 Cc. of ammonia water and 5 Cc. of ether are added, and the mixture shaken well. After the ethereal solution has become clear, it is filtered into a porcelain bowl and evaporated to dryness. To the residue fuming hydrochloric acid is added, by which on heating a red color should be produced.

Unguenta.—Precautions similar to those given under *Plasters* should be observed.

Ointments in which granules or liquids have separated or in which the ingredients are not properly mixed, so that they can be seen with the naked eye, and rancid preparations, should be rejected.

The ointments should be kept in a cool place in proper containers, preferably those made of porcelain.

Unguentum acidi borici.—This ointment is prepared with paraffin, sesame oil, and glycerin.

Unguentum diachylon Dr. Hebrae.—Lard is heated with lead oxide and water and to this petrolatum and oil of lavender are added.

Unguentum hydrargyri.—The constituents of this ointment are 300 Gm. of mercury, 100 Gm. of hydrous wool fat, 50 Gm. white wax and 550 Gm. of lard, giving an ointment with 30 per cent. of mercury. The latter is determined by a method similar to that of the U. S. P.

Unguentum zinci oxydati.—The ingredients for this ointment are: White wax 25 parts, liquid petrolatum 225 parts, anhydrous wool fat 225 parts, zinc oxide 25 parts.

Vina medicamentosa.—Only tokay wine is official, which should contain 15 per cent. of alcohol.

From the foregoing it may be seen that the new Hungarian Pharmacopœia must be considered as a perfectly up-to-date work.

In four points this pharmacopœia does not agree with most of the other pharmacopœias published during the last decade.

1. The exclusive use of Bettendorf's reagent for the detection of arsenic in chemicals, etc.

2. The extensive use of seame oil in place of olive oil and other fats in making ointments, oleates, etc.

3. The restricting the use of wine, to the single brand, the domestic tokay wine.

4. The lack of assay processes for volatile oils.

Baltimore, April, 1910.

Mr. Wilbert said there were several points about the Hungarian Pharmacopœia that were worth bringing out. To begin with, it was printed in two languages, the first part in Latin and the other in Magyar. He thought the Latin Edition was the official. A description was added, rather than an appendix. He said they seemed to be at a loss there for an editor, and had evidently discovered that the Latin portion of the book did not conform to the Magyar. Austria-Hungary, while one country, was an empire composed of two absolutely different peoples, with different ideals and different languages; and if there was anything that the Hungarians hate, it was an Austrian or anything Austrian.

The Chair remarked that the Croats had still another pharmacopœia.

The Chair asked Mr. Dohme what he thought about the value of sesame oil, which had been put in most all of the pharmacopœias, but had been dropped from the U. S. Pharmacopœia.

Mr. Dohme replied that he thought it was well adapted for keeping preparations; that it kept better than the other oils, as it contained a small per cent. of acid. Why the committee had dropped it, he did not know, unless it was not a commercial article. He said that when he was in France he found that sesame oil was very much used by pharmacists; that they preferred it to any fatty oil they could get.

The Chair said he much preferred it to olive oil.

A paper upon the Japanese Pharmacopœia, by J. Takamine, was read by title and referred, in the absence of the author:

REVIEW OF THE JAPANESE PHARMACOPŒIA, THIRD EDITION,
OFFICIAL SINCE JANUARY, 1907.

BY DR. J. TAKAMINE, N. Y. CITY.

HISTORICAL SKETCH, FIRST EDITION.

In 1880, the Director of the Board of Hygiene submitted the first project for founding a national pharmacopœia to the Minister of Home Affairs; the latter transmitted the project with recommendation to the Cabinet. It was approved and forthwith the government commissioned the Central Council of Health, a chartered organization composed of both medical and pharmaceutical professions, to undertake this pioneer task of compilation of pharmacopœia. A committee was appointed and the members thereof set to work according to the various branches of tasks they were assigned to. Informal meetings were followed by general conferences, and after five years investigations and studies the first draft was completed to be submitted to the Minister of Home Affairs.

In 1886 it was published and became official next year. It contained 470 articles in the text and the appendices included several important tables, list of reagents, and volumetric solutions, and general rules regarding pharmaceutical preparations. A Latin translation was also published.

In view of limited knowledge of medicine and pharmaceutical chemistry at the time of compilation, this pioneer task has been carried through commendably and laid the foundation for the Revision Committee appointed later. Several German and Dutch gentlemen of the medical and chemical profession, then in the employ of the government, shared a great credit in this undertaking whose participation has not since been required, as the country has made phenomenal progress in every branch of science.

SECOND EDITION.

No sooner had the first edition become official than it was generally felt necessary to revise the pharmacopœia in order to keep up with the rapid progress in the field of medicine and pharmacy, as the country has been unceasingly progressing to cope with it. A Revision Committee of ten was duly appointed from among the medical and pharmaceutical professions of the country and consisted of ten members.

After numerous investigations and due discussion, the Revision Committee completed a draft for the second edition which became official in 1892. A Latin translation was published at the same time. In this edition 23 articles found admission and 67 met the fate of expurgation. More than 1500 changes were introduced.

THIRD EDITION.

In 1900 the statute with respect to the revision of the pharmacopœia was enacted and established a permanent commission for that work. The statute provides that the Revision Committee shall be under the supervision of the Minister of Home Affairs; that it shall consist of a president, sixteen members of committee and two secretaries. The president, committee and chief secretary are appointed by the Cabinet in accordance with the recommendation of the Minister of Home Affairs. The members of committee and chief secretary are to receive each a sum not exceeding yen 500 (or \$250) and the under secretary yen 100 (or \$50) annually.

With the enactment of the statute, committee and other officials were duly appointed. The committee consisted of eleven chemists and five physicians. More thorough studies and investigations were made than for the previous revision. 119 informal conferences, 70 general meetings and 30 special conferences for members in charge of compilation have brought to fruit the publication of the present edition. Nearly six years elapsed before the draft was submitted to the Minister of Home Affairs for recommendation.

Changes in the text amounted to more than 815, and more or less alterations in each of the texts were made. In fact, it was practically rewritten. 224 articles were admitted and 23 omitted. The text, therefore, now contains 695 articles.

SCOPE OF THE THIRD EDITION.

Most medicinal substances more or less in general use were admitted in this edition. Disinfecting materials and disinfectants were adopted. In the arrangement of text, Latin names of articles were chosen to be set in alphabetical order. Chemical substances, whose constitution is fully established, were represented with their empirical formula, which followed Latin names. Atomic and molecular weight and Japanese names of articles were printed next in order. Oxygen was taken as standard. Size of test tubes and quantity of sample solutions to be taken were unified; selecting test tubes of nearly $1\frac{1}{2}$ centimeter diameter into which 10 Cc. of the solution shall be taken. Method of preparation is specifically given only when there is the necessity of unifying the quality of the preparation.

For measure and weight the metric system is used while temperature is measured with Centigrade, 15° of which is fixed as normal. Melting point is directed to be determined under uniform condition as specified. Fineness of powder is fixed and the temperature of maceration and digestion is put at 15° to 25° C. for the former, 35° to 45° C. for the latter. Drying of drugs shall never exceed 40° C.

In glancing over the text, those articles of known chemical constitution present no special aspect, since their quality and adulterations, etc., can be determined by ordinary chemical means. Among them, however, it is noticeable that 17 new remedial substances of known chemical constitution and therapeutic value are adopted, notwithstanding they are of more or less proprietary nature, such as aspirin, trional, urotropin, etc. These are however, admitted with chemical nomenclature, discarding those of registered mark. As to galenical preparations, general rules are given with the provision that special descriptions are to be found for each in the text where these rules are not applicable. A brief abstract of these subjects will follow.

EMPLASTRUM—PLASTER.

Unless specially prescribed, melt high-fusing ingredient first, then mix thereto the low-fusing substance. When molten mass partially cools, add medicaments and thoroughly mix and make into a suitable form as it cools down and assumes a homogeneous appearance.

Plaster is a solid mass at ordinary temperature but becomes plastic when warmed to body temperature. It should melt by warming further. Keep in a cool place packed in sheath or opaque paper. If the medicament is volatile, keep the same in closely covered tin.

EXTRACTS.

An extract is duly extracted from the drug for use as specified and evaporated on water bath with continual stirring at a temperature not exceeding 85° C. for aqueous and alcoholic extract and 35° C. for ethereal extract.

Extracts are divided into 3 classes :

No. 1 "Thin" extract : consistency of honey.

No. 2 "Thick" extract : stringy but not decantable.

No. 3 "Dry" extract : dry and reducible to powder.

Narcotic "Dry" extract is prepared by mixing 4 parts of No. 2 with 3 parts of licorice powder, and drying on water bath and making up to 8 parts after trituration and addition of sufficient quantity of licorice.

Instead of above, a narcotic extract may also be kept in a liquid state, which is accomplished by dissolving 10 parts of No. 2 extract in 6 parts of water and adding thereto 1 part alcohol and 3 parts of glycerin.

When 2 grammes of an extract is incinerated and the ash dissolved in 5 Cc. of dilute hydrochloric acid and filtered, the filtrate shall present no change by addition of hydrogen sulphide water.

Where proportion of ingredients is given, it signifies proportion by weight throughout whole text.

EXTRACTA FLUIDA.

In preparing fluidextract quantity of yield shall always be in same quantity as the material taken. Specially mentioned menstruum found in the text is sprinkled uniformly over 100 parts of the material until it no more absorbs the fluid. Whole is set aside for 2 or 3 hours under tight-fitting cover. Then the mass is packed uniformly into a suitable percolator, in which maceration is continued for 24 hours at the temperature of from 15° to 20° C. After the lapse of time, the liquid extract is drawn off at the rate of 40 drops per minute. 85 parts are thus taken and set aside. The remainder is extracted with as much fresh menstruum as necessary to exhaust material, and after combining the dilute fluid thus obtained is evaporated to a thin extract and dissolved in 85 parts of percolate first set aside. Leave same for a day or two at rest and filter after making to 100 parts with an sufficient quantity of fresh menstruum.

Test for the presence of metal is conducted as same as under Extracta, taking 2 grammes of sample.

INFUSION.

Boiled water is poured over the drugs finely cut and heated for 5 minutes on a water-bath, with frequent shaking. Strain after cooling.

If no specified prescription is given by the physician, it is taken for granted that 10 parts of infusion are to be made from 1 part of drugs.

Quantity of potent drugs must always be strictly described on the prescription.

PASTILS.

In default of any special prescription, pastils are made of finely powdered medicament with milk sugar as vehicle. Mixture is moistened with dilute alcohol and moulded to suitable shape weighing each 1 Gm. If shape cannot be made a little addition of gum arabic is allowed.

PILLS.

The ingredients shall first be thoroughly mixed and usually licorice powder or extract is used for shaping. They shall be made of uniform size weighing one-tenth gramme each, except in case where special prescription directs otherwise. Lycopodium or licorice is generally used for coating.

ROOTS.

Two roots are of Japanese origin and may be of interest to describe.

Radix gentianæ scabræ.

(*Gentiana scabræ* Bge var. *Burgeri* Max.)

Radix hibisci.

(*Hibiscus japonica*, Mig.)

The former is the substitute for Gentian and the latter for *Althæa*.

SPECIES—TEAS.

Cut, rasp or crush drugs and remove fine powder and obtain as uniform size as possible; mix them together. According to the facility with which infusion of the ingredients of drugs, different grade of division must be given to the materials. Tea-mixture is of a fine cut and that for fomentation is of coarse powder.

SERA.

Antidiphtheric and antitetanic sera are adopted, each in liquid and solid form.

Antidiphtheric serum in liquid form is required to possess a power of not less than 500 units in 1 Cc. as determined in accordance with Behring and Ehrlich method. It shall not be used if turbid or if it shows any precipitate, and must not be kept over one year. Three classes are mentioned.

No. 1, 600 antitoxic units.

No. 2, 1000 antitoxic units.

No. 3, 1500 antitoxic units.

Solid serum shall be of 5000 units. Antidiphtheric as well as antitetanic sera shall be kept sealed in a glass vessel with the label bearing the name of factory, the strength expressed in units of antitoxic power possessed by 1 Cc., the quantity of contents, the number of application and finally the date when it was tested.

SUPPOSITORIES.

Except in special cases cacao butter is employed as vehicle. Medicament is to be mixed alone with vehicle or some suitable liquid may be added if the conditions call for it. Potent and poisonous medicines are not allowed to be put up in hollow suppositories unless prescribers request it.

Shape of suppositories is cylindrical, spherical, conical and oval according to the convenience for use.

A rectal suppository is usually of a length of from 3 to 4 Cm. and 1 to 1½ Cm. in diameter at the base of cone, weighing from 2 to 3 Gm. A vaginal suppository should weigh from 4 to 6 Gm.

SYRUPS.

Unless special mention is made in the text they are prepared by dissolving required medicines in simple syrup or dissolving with sugar in the required proportion. Heating is once brought to boiling point of water and strained through cloth while still hot.

Keep in a bottle well filled. Those which show signs of fermentation or those which deposit precipitates shall be discarded.

TELA—GAUZE.

Antiseptic cotton or gauze such as boric, carbolic and salicylic acid, mercury bichloride, iodoform, first found admission in this edition.

TINCTURÆ.

Unless specially described drugs of medium cut and coarse powder are macerated in the menstruum and the vessel is kept closely covered in a cool place, shaken frequently during 7 days' maceration.

Strain and leave for several days to allow the deposit to settle and then filter with cover of glass plate over the funnel. Tinctures shall be kept in a cool, shady place.

UNGUENTA—OINTMENTS.

In order to prepare ointment, melt the base which liquifies with ease unless otherwise instructed, then add thereto that which melts with difficulty. Mix finally medicament into molten mass, when partially cooled, until a homogeneous mass is obtained. Those which decompose quickly must be prepared fresh for use. When a rancid odor is developed it shall be discarded.

VINA—WINES.

The preparations and preservation of wines should be conducted according to same mode and precaution as described under "Tincturæ."

Principal points in the text have so far been covered and what still remains to be added are the appendices. They are as follows:

No. 1. Reagents.

No. 2. Volumetric Solutions.

No. 3. Articles found in the text, which shall always be kept in any dispensary.

No. 4. Articles of the text which belong to the poisonous class and are required to be kept in the place under lock and key.

No. 5. Articles of the text which are classed as potent and requested to be kept separate from ordinary ones.

No. 6. Doses for adults, with special instruction that physicians should not be allowed to prescribe over-doses unless they mark their special purpose with exclamation point (!) on their prescription.

No. 7. Atomic weight of elements that are met with in the text. Oxygen taken as standard.

No. 8. Comparative list of chemical names with those of proprietaries.

The Japanese Pharmacopœia is the statute and its publication was made in the official gazette at the time of enactment. No individual can have the sole privilege of copy-right. It can be printed by any printer, so that nobody can monopolize the sale of the book.

Whilst a Latin translation of official nature was published for the first and second edition no translation for the present edition was made. However, it was desirable to have a translation and the Pharmaceutical Society of Japan has undertaken the task in pursuance of the desire shown both from official and private side. The English language was selected for the simple reason that it is the language which is most popularly used in Japan for foreign intercourse. The translation is a solid cloth-bound book of 424 pages.

The Chair said the Japanese Pharmacopœia leaned upon the U. S. P. The original, he said, was printed in Japanese, but he had before him a translation in English. This translation, however, contained a number of errors, some of which he pointed out.

Mr. Wilbert said the Japanese Pharmacopœia had also been translated into German, and that the pharmacopœia itself was really based on the German. The original was written in German, and translated into Japanese. A number of Germans had gone to Japan, and they took quite a prominent part in the making of the pharmacopœia.

The Chair said they had also taken a great many ideas from the American Pharmacopœia, as medicinal waters, etc.

The Mexican Pharmacopœia was reviewed verbally by Mr. C. A. Mayo, who also exhibited a copy of the book itself, and explained its features :

The Chair remarked that the Mexican Pharmacopœia was the first pharmacopœia published after the Brussels International Conference.

Mr. Wilbert explained the method of the Mexican Pharmacopœia in giving a general formula, and then enumerating some 25 or 30 others that might be made by that formula. He said the same was true of tinctures and alcoholic extracts. All through the book that feature was observed. It was printed in Spanish with English and Latin titles.

The subject of the Netherlands Pharmacopœia was presented in the following paper by Henry Kraemer.

THE NETHERLANDS PHARMACOPŒIA.

BY HENRY KRAEMER.

On recommendation of the Secretary of the Interior, her Majesty, the Queen, decreed on March 8, 1899, that a commission consisting of ten members be appointed to revise the Netherlands Pharmacopœia (*Pharmacopœa Nederlandica*).

The Commission as first appointed was constituted as follows: Five university professors, two of whom were professors in pharmacy, one a professor in botany, one a professor in chemistry, and one a professor in pharmacology; four practical pharmacists, and a chairman, who was the chief of the Board of Health.

The personnel of the original Commission was, however, somewhat changed through the death of two members and the resignation of two others, one of whom subsequently died.

Thus, the committee finally responsible for the work of revising the fourth edition of the Netherlands Pharmacopœia consisted of the following members:

1. Dr. H. Wefers Bettink, director of the Pharmaceutical Institute and professor of pharmacognosy, toxicology and chemistry, University of Utrecht, chairman.
2. H. P. Wijsman, professor in pharmacy, University of Leiden.
3. J. Gu. Moll, professor of botany, University of Groningen.
4. Gu. Nolen, professor of pharmacology, University of Leiden.
5. Dr. H. Zeehuisen, Army surgeon.
6. P. A. Vos, pharmacist in Rotterdam.
7. J. Guldensteeden Engeling, apothecary in the Province of Zeist.
8. M. J. Schroeder, pharmacist of Groningen.
9. L. van Itallie, pharmacist of Rotterdam, now professor in the veterinarian school in Utrecht.
10. Dr. M. Greshoff, director of the Colonial Museum in Harlem.

Before beginning the work of revision proper, the Commission asked the national society of medicine and the national society of pharmacy to make such recommendations as they deemed advisable, and they were given until January 15, 1900, in which to consider the matter and formulate their recommendations and suggestions. The Commission also took measures to obtain the views of physicians and pharmacists in the Dutch Colonies of the East and West Indies in regard to the manner in which the Pharmacopœia could be improved so as to suit their needs.

After considering the question in all of its bearings they determined to make a pharmacopœia which could be used both in the Netherlands and in the Colonies, giving such alternate formulæ as were necessary to meet the conditions, in the colonies, one of these being the tropical climate. Thus, in the case of ointments requiring 20 to 30 per cent. of adeps or

vaseline, provision is made for replacing these bases with *cera flava* or paraffin. In the case of the Indian drugs the local synonyms are appended at the end of the paragraph describing the drug, as for example, in the case of *Curcuma*, where the synonym, *temoe lawak*, is given.

The Commission, after having completed the work of revision, embodied the proposed corrections, additions and other changes in a supplement, which was published in 1902. Two or three years were then allowed to elapse in order that the proposed changes might be thought over and their merits and applicability in practice determined. After this preliminary testing of the new Fourth Edition it was published in 1905 and became the official standard on July 1, 1906.

The new work was first printed in Hollandese (Dutch) and then translated into Latin. The Latin edition contains about 550 pages, and is printed in clear type. The book happily combines the results of careful experimental work and improved methods required in the practice of modern pharmacy, and may be said to be the most complete and scientific of any of the national pharmacopœias.

While it is manifestly impossible to consider in extenso the various interesting features of the New Netherlands Pharmacopœia in the brief time at my disposal, I shall point out some of the general principles which maintained in the revision of the work, and perhaps call attention to some of the individual drugs and classes of preparations.

One of the notable features of the Netherlands Pharmacopœia, and which makes it a model for an international pharmacopœia, which it is in a certain sense, is that due to the adhesion of the Commission to the standards adopted by the Brussels Conference for the Unification of the Formulæ of Potent Medicaments. While the agreement for adopting these standards was not signed until November 29, 1906, that is, five months after the Pharmacopœia became official, the standards were practically adopted as proposed by the Brussels Conference in 1902, and the initials "F. I." (Formula Internationalis) are given after the title of each preparation of the potent drugs, as "Tinctura Aconiti, F. I."

The descriptions of the official articles are uniformly complete, rather than what might be termed adequate, as is the case in most of the other pharmacopœias. In practice this is found to be of very great importance, as one is not able to say that a supposedly insignificant character is not of importance at times. If uniform standards mean anything, especially with such potent drugs as aconite and digitalis, for which settled standards have not been provided, it would seem reasonable that the descriptions of the vegetable drugs, as they are the most indefinite substances on the market, should not only be accurate but fairly complete, so as to preclude the chance for misinterpretation. In the Netherlands Pharmacopœia these descriptions are frequently as complete as those for the alkaloids and other chemical substances, and in some instances much longer.

The titles for articles and the nomenclature are similar to those in the Third Edition. The main titles of the articles correspond in general to those customarily used in European pharmacopœias, with the exception of the chemical salts, where the acid radical precedes the name of the base, as Iodetum Kalicum for potassium iodide, and Benzoas natricus for sodium benzoate. While this is contrary to general custom, it may have some advantages, as the physician will find the iodides, benzoates and so on grouped together in their respective classes. The titles of vegetable drugs for the most part include a prefix which indicates the part of the plant used, as Cortex Granati, which title corresponds to the Granatum of the U. S. Pharmacopœia. Under the principal title a synonym is frequently given, as for example, Aqua Calcis, the synonym for Solutio Hydratis Calcici. Common-name synonyms as we know them in this country, are not given, except in the case of the East Indian drugs, already mentioned. This also would seem to have an advantage in that greater uniformity in prescription-writing would obtain.

Vegetable Drugs.—In the definitions of vegetable drugs it is noticeable that the names of families to which the plants belong are replaced by a citation of the literature giving the original description of the plant, as under Radix ipecacuanhæ, where we read, “Radices adventiciæ tumefactæ quas præbet Psychotria ipecacuanhæ, Stokes, Bot. Mat. Med. 1, 365 (Uragoga ipecacuanha, Baill. Hist. Pl. VII, 281).

The macroscopic descriptions are complete, and written in such a manner as to indicate that it is expected that dried drugs, such as leaves, will be softened before examination, and frequently the characters described are those requiring the use of a hand lens magnifying five diameters. The histological characters are also carefully described, including descriptions of both longitudinal and transverse sections of a number of drugs.

The powdered drugs are fully described, frequently at considerable length, beginning with the more important and prominent characters and extending to the less characteristic features. The descriptions are based on examinations made with the following reagents: Water, chloral hydrate solution, and chloral-iodine solution, and in special cases other reagents may be employed. It is furthermore directed that if the pharmacist has any question as to the authenticity of the sample examined he shall compare it with the powder of a drug, the identity of which is known or has been established.

It should be emphasized that this is a very important rule to observe. Considerable stress is laid upon the size of the tissues and cell contents and the manner of stating the measurements is quite a novel one.

As every one knows there are certain discrepancies in the literature with regard to the length of the fibers, size of starch grains, number of carpels, etc. In order to prepare accurate statements based on statistics which would allow for uncertain variations the latter were arranged in

such a manner that the curve of probability would indicate the different possible errors. This is determined as follows: The number indicating the minimum size is subtracted from that of the maximum size and the half of the remainder, known as the quarter (Quartilis) is taken to represent the probable mathematical error. The average (or median) size is obtained either by subtracting the quarter from the maximum or adding it to the minimum. The average size or the average number is indicated by M and the probable variation above or below this is indicated by Q , and thus we find under the description of the fibers of powdered cinnamon that M is equivalent to 480.5 microns and Q equals 55.7 μ , and thus one would expect to find a variation ranging from 433.8 to 545.2 μ .

In those cases where the curve of probability of error would be in asymmetry, as in the measurement of potato or maranta starch grains the size is indicated by an arithmetical ratio (\bar{x}). Thus under *Amylum solani* we find that "the error of asymmetry in length of the grain is given as 23 μ and is expressed as $\bar{x} = 23\mu$ ". This means that after making the measurements of a large number of grains in a certain field the sum of the sizes of the grains divided by the total number examined gives \bar{x} , or the arithmetical ratio.

Again, in the study of starch grains the position of the point of origin of growth or nucleus is indicated by a fraction, the numerator and denominator indicating respectively the distance of the nucleus from the two ends or the two extremes of the longer diameter. Thus, $\frac{1}{2}$ would indicate that the nucleus is central as in wheat starch; $\frac{1}{4}$ as in the case of potato starch grains where the nucleus is one-fourth the diameter from the narrow end. In the case of maranta starch the position of the nucleus is given as $\frac{1}{3} - \frac{2}{3}$, meaning that the nucleus is central or one-third the distance from the margin in longitudinal section.

In addition to the detailed descriptions of the macroscopic and microscopic characters of the drugs, assay methods are given for many of the potent drugs and statement giving the percentage of ash, amount of extractive, and also other special tests for identity or quality in certain cases.

Chemical Substances or Medicinal Chemicals. In most cases the formula of the chemical is given under the title. A purity rubric is not given, the descriptions and tests being so exact as to establish a high purity of the substance, as is generally the case with foreign pharmacopœias. In the testing of chemicals for impurities, unless a special procedure is given, it is directed that three drops of the reagent shall be added to 5 Cc. of a solution of the chemical. Under *Olea Pinguia* are given a number of general tests for the testing of fixed oils and fats together with exact methods of procedure in determining the iodine number, saponification figure and acid equivalent. Under *Olea Volatilia* similarly a general procedure is given for determining the presence of alcohol or fatty oils. In some cases, as under *Oleum Foeniculi*, the optical rotation is given, and

again, as under *Oleum Piperita*, a method is given for the proximate constituent, as menthol. In determining the melting point of fats and fatty substances capillary tubes are used in which the fat is taken up by capillarity after it is melted and then allowed to stand for twenty-four hours, when the melting point is determined by using a glycerin bath. Specific gravities are determined at a temperature of 15° C. As would be expected O-16 is taken as the basis for atomic weights, hydrogen being equivalent to 1.008.

Pharmaceutical.—The pharmaceutical portion of the book is characterized by the same originality and thoroughness as characterizes the parts already considered. In preparing vegetable drugs for grinding great care is exercised in the drying of the drug, none of the drugs ever being dried above 50° C. and those having volatile principles not above 40° C. and in some cases over quick-lime. They are then reduced to the fineness required and kept in ground-glass-stoppered bottles. Two kinds of sieves are used, one for coarse powders and the other for fine powders. In the sieves for coarse powders the meshes are round and are respectively in diameter 1½, 3 and 5 mm. These are designated as A_{1½}, A₃, and A₅. For fine powders a sieve of silk is used, the meshes being square, there being 10, 20, 30, 40 or 50 meshes in one centimeter. These meshes are indicated as follows: B₁₀, B₂₀, B₃₀, B₄₀, and B₅₀. If in connection with an article no fineness is given for the powder, it is intended that the pharmacist shall use a powder of the general degree of fineness designated on pages 308 and 309. Again, there are quite a number of powders which are directed to be kept protected from light and these are indicated by asterisk (*). The physical factors which influence the quality or stability of drugs, as light, temperature, moisture, have been given careful consideration, and it is directed that all drugs and preparations not in daily use shall be stored in dark rooms, and in this connection we note that certain vegetable drugs as *digitalis*, are to be kept in tightly closed tin drums in which are placed wide-mouthed bottles containing burnt lime and covered with leather or parchment provided with a suitable number of perforations. It is also directed that hygroscopic substances shall be kept in containers with burnt lime. Volatile substances are to be kept in tightly closed glass-stoppered bottles. Chemicals which are affected by the light are required to be kept in black, red or yellowish-brown colored bottles. Extracts and ointments are to be kept in jars which do not permit the entrance of light and must be kept in a cool place. The commonly used terms relating to temperature in pharmaceutical processes and manipulations all have a definite meaning. Thus, when applied to water, luke-warm means a temperature of 20°–40° C.; warm, a temperature of 60°–70° C.; hot, a temperature of 85°–95° C. Again, the temperature for the processes of maceration, digestion and infusion are respectively 10°–25° C.; and 90°–98° C.

In the weighing of drug materials three different grades of scales are directed to be used, which are designated as A, B, B₁. Scale A is used in weighing amounts of substances not exceeding 50 Gm., or 10 Gm with a finer scale. With this scale, which is known as a milligramme scale, the maximum declination or vibration should not be greater than two millimeters in one decimeter and not continue longer than one second when using a weight of 5 milligrammes. Scale B is known as a gramme scale and is used in weighing amounts not greater than 250 Gm. or 100 Gm. with a finer scale. With this scale the sensitiveness should be the same as Scale A, when using 50-milligramme weight. Scale B₁ is used for weighing amounts of substances not exceeding 1 kilogramme or 250 Gm. with a scale less sensitive than Class B. With this scale the sensitiveness should be the same as Scale A, when using a 250-milligramme weight.

Standard measures have likewise been adopted. A teaspoonful is defined as equivalent to 3 Cc. ; a dessertspoonful as 8 Cc. ; and a tablespoonful as 15 Cc., and physicians are requested to adopt the rule of using cubic centimeters when ordering liquid medicines. The standard dropper approved by the Brussels Conference has been made official ; the dropper has a bore of 3 millimeters at the exit end and dropping 20 drops of distilled water at 15° C., which should weigh 1 Gm. A table has been included giving the number of drops in a gramme of various liquid preparations and solutions.

Fifty-five of the articles official in the third edition were deleted, and 195 new articles were added, making a total number in the fourth edition of 652. Of these about 210 are required to be kept in stock at all times by the apothecary. The remaining 442 articles are indicated by a plus (+) sign. In accordance with the Brussels Conference, as already pointed out, the strength of tinctures of potent drugs is 10 per cent. Acidum hydrocyanicum dilutum, 2 per cent. ; aqua laurocerasi, one-tenth of 1 per cent., or one part in one thousand, of hydrocyanic acid. The different narcotic extracts and fluidextracts and liquor kalii arsenicosi, 1 per cent. ; pulvis ipecacuanhæ opiat, 10 per cent. of each of the potent drugs ; sirupus ferri iodati, 5 per cent. ; vinum stibiatum, four-tenths of 1 per cent., or 4 per thousand. In order that physicians as well as apothecaries shall have in mind the changes in strength of the preparations of potent drugs, the abbreviation F. I. (formula internationalis) is placed after the title.

In a table (Table A) a list of 42 poisons is given which should be kept in a closet to themselves. In another table a list of poisons is given which may be kept out convenient for use when marked by a label bearing a distinct blue cross. Another table includes medicines which physicians are required to keep on hand.

Thus with the number of drugs and preparations which the pharmacist must always have on hand and those which physicians are required to keep at hand the interests of the public are looked after in a manner which it seems to me is very commendable.

Doses.—In order to satisfy the expressed wish of most of the apothecaries of Holland who desired to have a guide that they might follow, compounding prescriptions containing potent substances, the single maximum dose and the maximum dose in twenty-four hours for an adult are given, these being given also in the index, which is in fact an alphabetical table giving in addition information regarding solubility in water and alcohol and indicating the drugs which are to be kept away from light and those which are to be kept in hermetically sealed containers. If a physician desires to use a larger dose, he is expected to indicate the fact by placing an exclamation point (!) after the name of the medicine specified. These doses hold not only for substances when intended for internal administration, but also when administered hypodermically, used in suppositories or applied to the skin.

First help tables.—In order that the pharmacist may be prepared to act in cases of sudden poisoning there is given in the Appendix an outline of procedure and a list of suitable antidotes which may be easily dispensed by him, he being required to summon a physician as soon as practicable.

The appendix comprises some eight or nine tables, including (1) General Reagents, (2) Volumetric Solutions, (3) a table of solutions of the alkalies and mineral acids giving the specific gravity, amount of the chemical in 1000 cubic centimeters, and the titration equivalent for each cubic centimeter. (4) A table giving the specific gravity of certain substances at temperatures between 12° and 35° C., as alcohol, ether, chloroform, mineral acids, etc.; (5) A table giving the number of standard drops in a gramme of various potent drugs; (6) an Alcohol Table; (7) A Saturation Table; (8) A Neutralization Table showing the amount of alkali necessary to neutralize acids or of acids to neutralize alkalies; (9) A table of atomic weights of the common elements.

While it would be desirable for some reasons to compare formula with formula and description with description of the Netherlands and our own Pharmacopœia this is manifestly impracticable, even with the many important ones, in a paper of this kind. I will, however, consider a few of the interesting features.

Not only has the Netherlands Pharmacopœia adopted the standards of the Brussels Conference for tinctures of potent drugs but also for certain alkaloids, as the Hydrochlorate of Cocaine, the title of which is Hydrochloras Cocaini, F. I. which means that it shall answer the original MacLagan's test for other coca alkaloids, and in addition to other tests there is a method given for the detection of cinnamyl ecgonine.

Under the various galenicals, as tinctures, various data are given for their identification and test of purity, as color, specific gravity, amount of extract, and certain specific tests. In the preparation of tinctures, unless a special method is given, either percolation or maceration may be used. When maceration is followed, the comminuted drug is mixed with the

proper quantity of the menstruum, allowed to macerate five days with occasional agitation and protected from light. The marc is pressed out and the liquid portion allowed to stand in a cool place for two days, when it is filtered, care being taken to prevent evaporation. In following out the percolation method the menstruum is divided into three parts, two of which are intimately mixed with the drug, and allowed to macerate for twelve hours. This macerated mixture is then added to a percolator and slightly compressed. Sufficient menstruum is added until the percolate begins to flow from the orifice of the percolator, the latter is then closed and the drug allowed to macerate for 24 hours. The stopper is removed and percolation allowed to proceed, and as much menstruum added as is necessary to make the required amount after expression of the marc. The tincture is allowed to stand for two days in a cool place, when it is filtered, taking care to avoid any loss through evaporation.

All of the tinctures of potent drugs are made by percolation, while all of the remaining tinctures are made by maceration. In the case of *Tinctura Secalis Cornuti* and *Tinctura Strychni* the fixed oil is first removed from the drugs by means of petroleum ether. There is a general test given for the detection of wood alcohol and acetone in tinctures.

Three classes of extracts of vegetable drugs are recognized : dry extracts or *Extracta Sicca* which contain not more than 6 per cent. of moisture : solid extracts, or *Extracta Spissa* which contain not more than 20 per cent. of water, and liquid extracts. The extracts of potent drugs are made by percolation in much the same manner as given for tinctures, the alcohol being removed either by distillation at a temperature not higher than 90° C., or it may be allowed to evaporate spontaneously until the extract has the desired consistency. Most of the extracts of the other drugs are made by maceration or infusion, it being understood that the processes are carried out at definite temperatures, considerable care being directed in the evaporation of the extracts. In *Extractum Secali Cornuti* chloroform water is used as a menstruum ; in a number of extracts a certain amount of glycerin is directed, as with cinchona. With the latter drug dilute hydrochloric acid also forms a part of the menstruum. In preparation of the liquid extract of *hydrastis* tartaric acid is added to the menstruum. Methods are given for the determination of moisture, the examination of the ash for metallic substances, and they are required to be protected from light, and in view of their containing soluble constituents, to be kept in glass-stoppered bottles.

It is rather surprising that in view of the increasing use of so-called animal drugs in this country, as antitoxins, etc., none of these articles are official in the Netherlands Pharmacopœia. This is probably accounted for by the fact that one of the principles of revision is not to include any substance, no matter how widely used it may be, which the pharmacist does not prepare or has no adequate means of testing. Neither are patented or trade-marked preparations official, the entire responsibility for

their quality resting with the manufacturer. On the other hand, formulæ are given for the preparation of teas (species), artificial aperient salts, as Carlsbad salts; medicated cottons and gauzes; granules, and so on. Indeed there are methods for every class of pharmaceutical preparations from Aquæ to Vinæ, and with standards or tests for every substance and preparation used. Everything that science or experience can offer is at the disposal of the physician, and the pharmacist can not misunderstand the specifications of the physician or fail to supply uniform and efficient preparations.

I may in conclusion say that the Netherlands Pharmacopœia is not only a very valuable practical guide for the retail pharmacist but that it furnishes high standards for the official drugs, the revisers having availed of the scientific progress touching their work and having also manifested a broadly democratic spirit. We have also in the Netherlands Pharmacopœia a standard, which while revised by authority of the Government, yet strictly speaking none of the members of the Commission are Government officials. The Commission is a small one, and the members are directly responsible for the work, which while it serves as a guide for the pharmacist, is clearly for the protection and benefit of the people.

The Japanese have used it as a model since 1880, and it would be well if an English translation were available for consultation and study in this country.

Finally, I acknowledge my indebtedness to Mr. Peter Amsterdam for assistance in translating and critically examining certain portions of the Latin edition. I have also had access to two excellent reviews of this work, one by Schoepp in the *Apotheker Zeitung* for 1906 and 1907, and another by Weigel in the *Pharmaceutische Zentralhalle* for 1906.

The Chair said he thought Mr. Kraemer certainly deserved the thanks of the Section for this very instructive paper, as he had taken a great deal of pains with it. He wanted to point out particularly that the Netherlands Pharmacopœia differed from the others somewhat, in that it contained a chapter on antidotes. He commended this idea as an excellent one, and as one which would be of great service to the pharmacist when hastily summoned to give relief in an urgent poison case.

Thereupon Mr. Hallberg moved that this Section request of the Association in general session that it recommend that a chapter on antidotes, similar to that of the Netherlands Pharmacopœia, be published in the next edition of the U. S. P.

This motion was seconded and carried.

The Scandinavian Pharmacopœia, covering the countries of Denmark, Sweden, and Norway, was presented in verbal abstract by Mr. Hallberg, the full text of his paper to be submitted later.*

* Unfortunately Prof. Hallberg failed to prepare the paper, and his subsequent illness and untimely death have prevented a continuation of his labors.

Mr. Wilbert said the Danish Pharmacopœia was perhaps the only one that complied absolutely with the Brussels protocol. He thought this was the only Pharmacopœia that directed that opium preparations be made by percolation, and gave in detail the process. The Austrian and one or two others gave directions that opium should be made by percolation, but did not give directions.

A paper upon the Spanish Pharmacopœia was read by title and referred. The full text here follows :

A GLANCE AT THE FARMACOPEA ESPAÑOLA, VII.

BY HUGH CRAIG, NEW YORK.

Early in one's acquaintance with the seventh edition of the Spanish Pharmacopœia he is impressed with its blending of progressiveness and mediævalism. As evidence of the progressive element among the profession in Spain there is the official sanctioning of a process for preparing "bromo-formo" and another for "aristol" and the fixing of a standard for anti-diphtheritic serum ; that the pharmacy of the past still survives in that country is shown by the official recognition of snails as a demulcent, and soot as a vermifuge. Truly the revisers succeeded in their expressed desire to harmonize tradition and progress.

The revision of the Spanish Pharmacopœia is undertaken at irregular intervals by a permanent commission appointed by the Royal Academy of Medicine. There were seven members of the commission which prepared the present edition ; all use the title "Doctor" but I believe four of them were pharmacists. The work of revision was begun in 1903 ; and the revised pharmacopœia received the royal approval, June 21, 1905. All such new medicinal agents were added as had proved, in the experience of the clinic of the academy, useful in the present-day demands of therapy, and whose real composition and mode of preparation were not secret.

Each material is concisely described, the chief characteristics by which it may be identified being clearly stated. The descriptions of vegetable drugs are particularly good ; and in several instances the more common adulterants are named. For aloes, catechu, wax, and most of the gums and resins identity tests are given. There are few purity rubrics, but each chemical agent is required to satisfy several given tests as to its purity. Statement is also made of the chief microscopic characteristics of calamus, cascara sagrada, catechu, cinchona, cinnamon, conium fruit, coriander, cotton, elemi, fennel fruit, granatum, honey, ipecac, lycopodium, musk, oleoresin of male fern, opium, phellandrium, pine tar, pyrethrum, quassia, quebracho, starch, storax, tea, and tolu. An ash-limit of 10 per cent. is fixed for asafetida ; and one of 6 per cent. for cochineal.

In the prologue it is stated that the process of manufacturing medicinal chemicals is given in the case of those which may not be more advantageously prepared in large quantities and those which require especial

care in their preparation for medicinal use. Some of the official processes are those for acetic acid, gallic acid, hydrochloric acid, nitric acid, phosphoric acid, monobromated camphor, absolute alcohol, chromic anhydride, quinine alkaloid, sodium and potassium tartrate, and a number of the newer organic medicinal chemicals. The pharmacist is advised to test all chemicals purchased, and there are official processes for purifying sulphuric acid, sodium borate, sodium chloride, ether, mercury, and several other "heavy" chemicals. The atomic and molecular weights are based on the International Table for 1904; as 16 is taken as the weight of oxygen, the official figures differ from those of the U. S. P. A wide variation frequently exists between the figures of the F. E. and those of the U. S. P. for solubilities and melting points; although the solubility figures of the F. E. are computed at a lower temperature (15° to 15.5° C.) they frequently vary inversely from those of the U. S. P.

The standards of the Brussels Conference of 1902 for preparations of potent drugs have been adhered to quite generally. All formulas must satisfy the Commission pharmaceutically and pharmacologically before they are made official. Much space has been saved through the use of type-processes for the various groups of galenicals.

At the end of the article under each title—in such cases as the substance or preparation is *per se* a medicament—are given the therapeutic uses, manner of employing, and the doses for an adult, the pharmacopœia being considered as necessary to the physician as to the pharmacist. When a doubt exists as to the value of a medicament the statement of its therapeutic use is qualified by the words "recommended for the treatment of," etc. The doses are given only in the metric system, drops being stated in the equivalent fractions of a gramme.

The nomenclature of former editions has been retained as more intelligible to those who use the pharmacopœia (to quote from the prologue). It certainly is puzzling to the foreign user to find solution of ammonium acetate and solution of lead acetate among the "acetatos"; solution of potassium sulphide under "sulfuro"; solution of potassium arsenite among the "soluciones"; tincture of iodine in the same group; poppy capsules and leaves under "adormidera"; poppy petals as "amapola"; "aristol" as an official name, and "salol" as a synonym. The Spanish seem to have recognized the possibilities of the coined name, and among the official Spanish titles one meets—in a slightly changed orthographic dress—such old friends as "creolina," "euforina," "exalgina," "euquinina," "fenacetina," "formol," "ictiol" (The English name ichthyol is given as a synonym, and the substance is allotted the formula $C_{20}H_{30}S_2O_6[NH_4]_2$, "sacarina," "sulfonal," "trional," "uretano," "vaselina" and "zeroformo.")

In former editions of the F. E. the *materia farmacéutica* and the *preparaciones farmacéuticas* were given in two separate parts of the book.

They have now been united in alphabetical order, following the general custom. The first part of the present edition is devoted to a number of tables of weights and measures, specific gravities and their comparison with percentage solutions, alcohol dilutions, drops in a Gm. of official liquids, etc., and a list of reagents and clinical and volumetric solutions.

Percolation is directed in the processes for many of the extracts and tinctures, for compound syrup of sarsaparilla, and for oleoresin of male fern.

First in the list of "preparaciones y materiales farmacéuticas" is "aceite alcanforado," the oft-troublesome camphorated oil. *Oleum camphoratum* is the official Latin name, and *linimentum camphoratum* is the synonym. The formula calls for 10 Gm. of powdered camphor in 90 Gm. of olive oil, to be heated on a water-bath in a stoppered container. Only the fixed oils or the medicated oils made by infusion or otherwise with a fixed oil base are known as "aceites." Some of the infused oils are polypharmaceutical wonders; one "*oleum stramonii compositum*," contains eighteen ingredients besides the base. There are two phosphorated oils: 1 in 100 for external use; the other for internal use a 1 in 10 dilution of the first.

Benzoic acid it is directed to be made from benzoin. No source of salicylic acid is given; neither is there an official process. Potassium ferrocyanide and sulphuric acid are used in the preparation of "*acidum cyanhydricum medicinale*," a 2 per cent. solution of HCN. There are two diluted sulphuric acids, one alcoholic of 25 per cent. strength; the other a 10 per cent. solution in water.

"*Aconitum*" includes both the root and the leaves, although only the root is used in the preparation of the extract and the tincture. Under the official title quite frequently more than one part of the plant is included, e. g. the leaves and seeds of *hyoscyamus*; the root and leaves of *belladonna*; the seed and fruit of the pumpkin; strawberries and their root; and the fruit, leaves and flowers of bitter orange. Generally but one of the parts enter into an official preparation; not so with *arnica* and *hamamelis*, both the flowers and root, and the bark and leaves, respectively, being used in the official tinctures of these drugs. Cacao butter differs from coco butter which is coconut oil. "*Sanguinaria*" is the inflorescence of *paronychia argentea*, a member of the four-o'clock family.

Among the "aguas" are carbonated waters, cologne waters, eleven distilled aromatic waters, albuminated water, "aqua calcis," "aqua chlori," "aqua fenicata" (2 per cent.) "aqua nitrogenata," "aqua oxigenata" (10 volumes), "aqua saturata oxigeni," "aqua alba" (lead water), distilled water and sterilized water—this latter being used chiefly in the preparation of solutions for hypodermic injection, several such being official.

Formulas are given for two embalming fluids.

Absolute alcohol, 95 per cent. alcohol, and 60 per cent. alcohol are

official, although 70 per cent. alcohol is most used as a menstruum. There are also a number of aromatic alcohols or spirits of from two to fifteen component parts.

Cottons, plain, purified and variously medicated receive official recognition. Processes are given for preparing the latter as well as for several medicated gauzes.

"Ammoniacum" is the official Latin name for an aqueous solution of NH_3 made through the interaction of ammonium chloride and lime. The strength is 22 degrees Baumé, specific gravity 0.923.

The metals, antimony, bismuth, gold, iron (in three forms), lead, mercury, silver, tin, and zinc are official. Tin and iron are used *per se* as remedial agents.

The official "aristol" (synonyms "diiodothymolum" and "thymolum biiodatum") is made through the interaction of iodine 60, potassium iodide 80, in distilled water to make 300; and thymol 15, sodium hydroxide 15, in distilled water to make 300.

"Linimentum saponis camphoratum" is a synonym of "balsamo opodeldoch liquido," containing olive oil soap 10, camphor 9, solution of ammonia 4, oil of rosemary 2, oil of thymol 1, and 80 per cent. alcohol 100, "balsamo opodeldoch solido" contains lard soap 12, camphor 10, the same quantities of solution of ammonia and essential oils as the liquido, and 100 parts of 90 per cent. alcohol.

"Candelillas" or bougies are made with a base of glycerin, honey, sugar of milk, and acacia, and are coated with isinglass. Three formulas are official. There are three official ovules with a glycerogelatin base; one glycerogelatin suppository of rhatany; one of plain cacao butter; and one of aloes and sodium chloride with a base of evaporated honey.

Starch capsules are officially described. Formulas are given for making gelatin capsules of three textures, for liquids.

Cataplasms of linseed meal and of bread and lead are official, but there is no clay poultice.

"Cerato simple," F. E., is a mixture of almond oil and white wax. "Cold cream" is a synonym for "ceratum spermatis coeti," which contains almond oil, rose water, white wax and spermaceti. "Ceratum galeni" is an admixture of almond oil, rose water and white wax. The "pomadas" are almost identical with the ointments of the U. S. P. The bases are lard, alone, and with wax, suet, glycerin or almond oil, and vaselin. The last-named is used as the base for potassium iodide. Lard and glycerin form the base for the pomade of iodine and potassium iodide, which contains 4 per cent. of each substance. The "unguentos" are polypharmaceutical preparations, the bases being various mixtures of lard, wax, olive oil, suet and resin. "Unguento de artanita compuesto" contains aloes, asafetida, sodium chloride, scammony, jalap, chamomile, resin, artanita, wax, lard and olive oil. It is recommended as a purgative for children, to be applied with friction to the abdomen.

Mercurous chloride is official in three forms—precipitated, sublimated and vaporized.

“Creolinum” is described as a preparation of the heavy oil of coal tar and an oleo-resin soda soap; no process is given for a similar preparation. Cresol is official.

The official standard for diastase requires that, when mixed with 60 times its weight of starch in a 6 per cent. paste and heated for 6 hours at 50° C. it should form a liquid which will pass readily through a filter and decolor five times its volume of normal cupro-potassic liquid.

Pancreatin—also called “trypsina”—in a one-half of 1 per cent. aqueous solution, neutralized with sodium bicarbonate is required to dissolve 100 times its weight of coagulated and shredded albumin in 6 hours, at a temperature of 40° C. By the starch test the standard is 1 to 300.

A process is given for making pepsin from the rennets of sheep or calves, or the stomachs of hogs. The digestive power required is 1 to 10 of dried fibrin, in an acid medium.

There are official formulas for three ophthalmic gelatin discs.

As examples of mediæval pharmacy, the “electuarios” stand well to the front. “Discardio” contains eleven ingredients in honey of roses. “Triaca” (theriaca) has fifteen aromatic and medicinal constituents in a vehicle of honey, wine, and honey of elder.

Fifteen plaster masses are official, the bases being several, and the ingredients of some being many. Five sparadraps receive official recognition. Cantharides plaster must be spread on red cloth.

Irish moss is the agent directed for emulsifying cod liver oil. No sugar is used in the emulsions of this oil, which contain 12 per cent. glycerin. In the articles on the essential oils particular attention is given to their physical characteristics and their reaction with iodine. When they are optically active the fact is stated only in the general terms, dextrogyrate or levogyrate.

“Spiritus nitri dulcis” is a mixture of alcohol 60, and nitric acid 20. “Liquor anodynus mineralis Hoffmanni” is the Latin synonym for a mixture of ether 80, and alcohol 20.

Of extracts there are three sorts—aqueous, alcoholic and ethereal. The first-named are officially described as of the consistency of “a pill mass or a soft extract.” Aqueous extract of opium is a powdered extract and should assay 20 per cent. of morphine by the process given for opium. The tincture of opium is prepared from the extract with 70 per cent. alcohol. The consistency of the alcoholic extracts should be such that they “will not adhere to the fingers when cold.” The alcoholic extract of nuxvomica is a powdered extract, which should assay 16 per cent. of alkaloids by the following method:

Five grams of the extract are dissolved in 30 grammes of water made alkaline with a slight excess of sodium carbonate. This solution is shaken

with 10 grammes of chloroform ; the chloroform layer decanted and shaken with water acidulated with sulphuric acid ; the aqueous acid liquid is decanted ; to it is added solution of ammonia in excess, and it is then shaken with 15 grammes of chloroform. The chloroform layer is separated and evaporated, and the residual alkaloids weighed.

Fluidextracts are scarce in the Spanish Pharmacopœia. Two only are official : hamamelis and hydrastis, each a 1-in-1 hydro-alcoholic liquid, containing 10 per cent. of glycerin. "*Extractum fluidum rhamni purshiani*" is a synonym for the alcoholic extract of that name, a 10-in-3 solid extract.

In making Blaud's pills it is directed to triturate first the potassium carbonate with the ferrous sulphate until a soft paste is procured. A solution of ferrous iodide is prepared as the first step in making Blancard's pills ; honey is added to this and the mixture evaporated. Then the pills are made by adding dry excipients.

The official "*tabletas*" are lozenges with a base of sugar and tragacanth.

Four basic soaps—almond oil, olive oil, cocoanut oil and lard—are official ; all are soda soaps. There is no official soft soap. Three medicated hard soaps are official.

Sweet medicines appeal to the Spaniard. He puts sugar in his decoctions, and he has fifty official syrups. The medicinal ingredients of these range from acacia to strychnine sulphate, including iron arsenate, iron iodide, codeine, belladonna, opium, ether, and mercuric-potassium iodide. "Simple" syrup contains but 64 per cent. of sugar. In making syrup of tolu, the tolu is digested in the water at 60°, and the sugar dissolved in the decanted liquid.

Two solutions of magnesium citrate are official. They are called "*limonadas purgantes*;" one is not effervescent.

"*Linimentum ammoniacale*" is a mixture of 10 parts of solution of ammonia, and 90 parts of olive oil. "*Linimentum oleo-calcicus*" contains 35 parts of almond oil, and 65 parts of lime water. Most of the preparations known as liniments will be found elsewhere than in the "*linimento*" group.

The official requirement for opium is that it contain 10 per cent. of morphine. The assay process is as follows : Triturate 15 grammes of opium with 8 grammes of recently slaked lime ; place the mixture in a capsule with 150 grammes of distilled water and heat to 50° or 60° C. for two hours, stirring and replacing the water lost by evaporation. Filter the mixture when cold, and retain 106 Cc. ; add to this 25 Cc. of ether and 3 grammes of ammonium chloride, agitate gently ; set aside for 3 hours ; decant the ethereal layer ; shake out the residue twice with ether ; mix the ethereal liquids ; set aside for 12 hours ; collect the precipitate on a filter ; wash container with water ; dry the precipitate at 95° C. ; wash out the narcotine with chloroform ; and weigh the morphine remaining. If any

more than 0.92 Gm. of morphine is obtained by this process the opium assayed may be considered standard.

Dover's powder is made with a diluent of equal parts of potassium nitrate and potassium sulphate. The strength is the same as that of the U. S. P. preparation.

Ipecac is required to contain 2 per cent. of alkaloids, and guarana, 3 per cent. of caffeine. The official jalap must contain from 15 to 18 per cent. of resin. No assay process is given for any of these.

Nux vomica is standardized at 2.5 per cent. of alkaloids, but no assay process is given. The tincture is made from the powdered drug.

Three species of cinchona are recognized: cinchona calisaya, 2.5 to 3.5 per cent. total alkaloids, principally quinine; cinchona officinalis, 2 to 3 per cent. total alkaloids, principally cinchonine; and cinchona succirubra, 2 to 3 per cent. total alkaloids, principally quinine. Microscopic descriptions are given but no assay processes.

The source of the official alkaloids is seldom given, a noticeable exception being in the case of sparteine from spartium scoparium.

Solution of hydrogen dioxide is standardized by collecting and measuring the volume of the oxygen freed by the action of sodium hydroxide and manganese dioxide on the solution.

There are official methods for standardizing cherry-laurel water, and for detecting saccharin in sugar.

Anti-diphtheric serum is official in 2 forms: liquid, with a minimum content of 200 Ehrlich antitoxic units in each cubic centimeter; and solid (powder or scales) made by evaporating the liquid in a vacuum at 20° to 25° C. It is not lawful to employ serum other than that made in laboratories licensed by the government.

There are five official aqueous tinctures, varying in strength of the medicinal constituent from 1 per cent. to 3 per cent.; thirty-nine hydro-alcoholic tinctures, whose menstrua contain from 60 to 90 per cent. alcohol; a 1-in-1 chloroformic tincture of cantharides; and three ethereal tinctures.

The vinegars of the Spanish Pharmacopœia are made with wine vinegar, fermented or distilled. The medicinal wines have as menstrua various native wines, a number of which are official; so too are coffee, tea and cacao beans, but not extract of malt or any spirituous liquor.

"Acetum opii compositum" represents 50 per cent. of opium, with saffron and nutmegs. "Vinum opii compositum" (Laudano de Sydenham) represents 10 per cent. of opium, with cinnamon, cloves and saffron.

These are the essentials of the seventh edition of the Spanish Pharmacopœia from the viewpoint of one who is not a user of the book. Perhaps had I an acquaintance with the inside workings of a Spanish pharmacy my viewpoint would experience a change of location.

The Chair remarked that the Spanish Pharmacopœia was the poorest in Europe.

"The paper upon the Pharmacopœias of Spanish America" was the title of a paper by M. I. Wilbert, and Mr. Wilbert presented his subject as follows:

THE PHARMACOPŒIAS OF SPANISH AMERICA.

BY M. I. WILBERT.

Largely, perhaps, because of the inherent self-conceit which is such a predominating characteristic of the Anglo-Saxon people we "Real Americans" have essayed to prepare for the less favored inhabitants of Spanish America a translation of our admittedly excellent Pharmacopœia; and some, if not all of us, may perhaps feel disappointed, should this translation not meet with the immediate and widespread acceptance in the countries to the south of us that we think it deserves.

In view of these, our expectations, it may be advisable to point out some of the reasons why we should not be over-sanguine in this regard, and why we should be content to consider the Spanish translation of the U. S. P., as something in the nature of legitimate Home Missionary work, rather than a much desired pharmacopœial ideal for the Spanish American people with whom we have as yet little in common.

We should also not forget that members of the Board of Trustees, who were more directly concerned in the publication of the Spanish Edition of the U. S. P. were particularly desirous of supplying an acceptable book for the Spanish-speaking sections of the United States, for our recently acquired Insular possessions and for Cuba, our Island neighbor, whose trade interests naturally bring its people into close touch with the people of the United States.

The remaining Spanish American countries have much less in common with us, at the present time, and it would be folly indeed to expect that any one or all of them would be likely to adopt or follow either our Pharmacopœia or our pharmaceutical methods and practices.

To illustrate the reasons for this assertion it will suffice to call attention to the fact that the practice of pharmacy in Central and South America is generally based on Continental usages and not on the practices now in vogue in English-speaking countries.

The Pharmacopœias of France, Spain and Germany, about in the order named, have been, and still are, widely used throughout Spanish America and naturally they have left their impress on the several Spanish American Pharmacopœias that are now available.

So far, there are four well-known Spanish-American Pharmacopœias: The Pharmacopœia of Mexico, of which the fourth edition was published in 1904, the Pharmacopœia of Venezuela, published in 1898, the Pharmacopœia of Argentine, published in 1898, and the Pharmacopœia of Chili, published in 1886. All of these several pharmacopœias are interesting, and all present some more or less unique features.

THE PHARMACOPŒIA OF CHILI.

The Pharmacopœia of Chili, the oldest of these several Pharmacopœias, is evidently an elaboration of the German Pharmacopœia II, was compiled in Chili by Adolfo Murillo and Carlos Middleton, and printed in Germany, by F. A. Brockhaus, Leipzig, 1886. The book contains a total of xii and 457 pages, 8vo., and the descriptions and formulas are arranged alphabetically according to the Spanish titles.

Each class of drugs or galenical preparations is prefixed by a class title and in connection with galenical preparations, general methods of procedure are also given.

The total number of titles in this Pharmacopœia aggregate 724, including 52 general headings or definitions, 191 crude drugs, 167 chemical substances and 314 galenical preparations.

An appendix contains a table giving maximum, single and daily doses of potent medicaments, also a table enumerating the several class-headings, and preparations with page reference and a special index showing the available preparations of each official drug.

The descriptions are graphic and concise, and include tests for identity and purity, directions for preserving and some reference to therapeutic uses.

/ THE PHARMACOPŒIA OF ARGENTINE.

The Codex Medicamentarius or National Pharmacopœia of Argentine, both in size and in the arrangement of some of the contained material suggests the influence of the French Codex, though the descriptions and requirements indicate some degree of German influence.

The now official, first edition of this book was published in Buenos Aires, in 1898. It was compiled by a Commission appointed by the Chief of the National department of Hygiene, which department was by law authorized to undertake the preparation of a National Pharmacopœia, and each copy contains a number of the order and the seal of the National Department of Hygiene as a guarantee of the authenticity of the book. This Pharmacopœia comprises a total of x and 790, large 8vo., pages. The book is printed in Spanish, and the articles are arranged alphabetically according to the Spanish titles. No less than 509 pages are devoted to the official descriptions of drugs, 30 pages to reagents, 42 pages to tables and 100 pages to a double column index.

The index is somewhat of an innovation in that it gives the official Spanish title in heavy-faced type, the Latin name in Italics and other references, including synonyms in Roman type, cross references appearing throughout.

The Pharmacopœia of Argentine includes a total of 742 titles, or 14 general headings, 145 crude drugs, 195 chemical substances and 388 galenical preparations. The descriptions and definitions are rather comprehen-

sive. They include descriptions of the microscopical characteristics of drugs, chemical tests for active principles and possible contaminations, solubility factors, physical properties of galenical preparations, therapeutic uses of various substances and doses.

The appendix contains general directions for conducting the several tests and comprehensive tables showing equivalent weights and measures, equivalent degrees of temperature in centigrade, Réaumur and Fahrenheit scales, the influence of temperature on the specific gravity of a number of official substances and a table giving the solubility of official chemical substances in cold and in hot water, also in alcohol, ether, chloroform and glycerin.

THE PHARMACOPŒIA OF VENEZUELA.

The Pharmacopœia of Venezuela also evidences the influence of the French Codex, which was, formerly, the legally recognized national standard. The "*Farmacopea Venezolana*," approved by the medical council of the Republic as the Pharmaceutical Codex of Venezuela, was compiled by Francisco A. Risquez, and published at Caracas, in 1898.

The prologue discusses the need for a National Codex, and points out that while the desirability of complying with other national standards was fully recognized the Pharmacopœia of the United States and the Pharmacopœia of Great Britain are not well suited for this purpose, as they do not provide for the use of the metric system as usually followed in Venezuela and other Spanish American countries.

The Pharmacopœia of Venezuela contains a total of xxi and 466 pages 8vo., and includes some 795 pharmaceutical titles: 52 general headings, 292 crude drugs, 118 chemical substances and 333 preparations.

The book is divided into four parts: Preliminary notices, simple substances, galenical preparations, and miscellaneous.

The first part contains a description of weights and measures, thermometry, specific gravity and a number of tables: among others, a table of solubilities in water and alcohol, and a table of maximum, simple and daily doses of potent medicaments, a list of incompatibilities and a list of reagents and volumetric solutions.

The second part contains descriptions of simple drugs, including chemicals. The monographs are quite comprehensive and include physical and chemical characteristics, properties and uses and doses. The articles are arranged alphabetically according to their Spanish titles, Latin names appearing only as synonyms.

Part three, devoted to galenical pharmacy, is prefaced by a general description of pharmaceutical operations including calcination, distillation, evaporation, filtration, lixiviation, maceration, sublimation, etc.

The official formulæ are divided into classes, and each class is accompanied by a concise definition. Extracts and fluidextracts are presented

in tabulated form giving the name of the drug, the part employed, the menstruum to be used, and in connection with extracts, the amount of resulting product from 1000 Gms. of the drug used.

Part four contains a description of mineral waters, a compilation of the laws of Venezuela relating to Pharmacy and Medicine, a list of articles allowed to be sold only on prescription, a list of proprietary preparations approved by the Medical Council and an index.

The most radical innovation, however, so far as National Pharmacopœias is concerned, is to be found on the advertising pages, some ten in number, evidently utilized as a source of revenue. They are taken up by the announcements of local pharmacists and advertisements of French proprietary specialties.

✓ THE PHARMACOPŒIA OF MEXICO.

The Mexican Pharmacopœia, the largest, and in many respects the most comprehensive of the Spanish American Pharmacopœias is of unusual interest, because it is the only one revised or issued since the meeting of the International Conference at Brussels, in 1902.

This Pharmacopœia was first published in 1874, and the present fourth edition, was published in Mexico in 1904, under the auspices of the Pharmaceutical Society of Mexico. The book was revised by a Committee of seven and is decreed to be official in the Federal District and in the Territories. The general characteristics of this Pharmacopœia have been reviewed by Mr. Mayo, and I desire to call attention only to some of the more specific features which serve to illustrate the influences that have dominated pharmacy and medicine in Spanish America. Like the Pharmacopœia of Venezuela, that of Mexico is also based on the earlier editions of the French Codex. It is divided into parts: the natural products, chemical substances and pharmaceutical preparations being classified separately, the articles being arranged alphabetically, according to the Spanish titles.

In the new Fourth Edition the Protocol of the Brussels Conference has been closely adhered to, even to the inclusion of the normal drop-counter. Regarding this later innovation, the introduction says: "In pharmaceutical practice measures of capacity should not be used, but all medicants, in general, should *be weighed*. When it is necessary to measure by drops any small quantity of liquid use should be made of the *Normal drop counter* prescribed by the Brussels Conference."

The remaining pharmacopœias that are authoritatively recognized in Spanish American countries, are the Spanish and the French, both of which have the general characteristics that appear to appeal to pharmacists in Latin America.

The Spanish Pharmacopœia has the official articles arranged alphabetically according to the Spanish titles, while the Codex is arranged according

to French titles. In this connection we should also remember that in the greater portion of Spanish America, the French language is quite as familiar to educated people as is the Spanish.

The German Pharmacopœia, while it appears to be well-known throughout South America, largely because of the ubiquitousness of the German Apotheker, has nevertheless failed to make much of an impress on local conditions. It is used as a reference book, and is appreciated because of its merits, but it is not popular, and so far as known, has not been adopted by any one of the South American countries as an authoritative standard.

From the evidence presented, it would appear that pharmacists in the greater portion, at least, of Spanish America, have been trained in the Continental method of weighing liquids, and do not take kindly to the use of measures of capacity.

They are thoroughly familiar with metric quantities and metric equivalents for English weights and measures, including our "approximate measures," do not appeal to them.

They are habituated to the use of Spanish or French titles, and do not appear to require the Latin names; therefore, do not take kindly to a book arranged alphabetically according to Latin titles.

They have learned to appreciate general formulas and class descriptions as given in the Codex, and would no doubt require a continuance of such descriptions in any book of this type that is to be used at all widely.

From what has been said we should not infer that because the pharmacists of Spanish America are not inclined to accept our ideas and opinions regarding pharmacopœias and pharmaceutical practices they are in any way lacking in professional spirit or training.

The late Nicholas Senn, in his "Travel Notes from South America," clearly points out that the medical and pharmaceutical professions are well established, and are largely made up of men who are thoroughly well equipped and who stand high in their respective communities. By training and affiliation they have much more in common with people of Continental Europe than they have with us. In many ways they are more cosmopolitan and less hampered by local prejudices than are we in the United States.

In conclusion, I would reiterate the belief that the publication of the Spanish edition of the U. S. P. will have a broadening influence on American pharmacy in that it will tend to bring our Pharmacopœia more directly in competition with the corresponding standards of Continental Europe, and will thus serve to expose the shortcomings of our ideas and practices in a way that could never be done at home.

Mr. Mayo said he had been told by a member of the Association, a resident of Porto Rico, that the U. S. P. was adopted by Costa Rica long before it was presented in the Spanish language.

Mr. Wilbert said that in Costa Rica a number of pharmacopœias were

adopted as official, and among them the U. S. P. The French Codex was also official there. In Cuba, however, the U. S. P. was the official and legally recognized standard. The Cuban Government, some two years ago, had adopted the U. S. P. as the official Pharmacopœia of the island of Cuba. The Spanish translation was in use now, and was also being introduced in the Philippine Islands. He thought it would be very interesting to see whether American practices would be used in connection with the Pharmacopœia, or the Pharmacopœia used in connection with European practices.

The Chair told of the incident of a Spanish translation of the U. S. P. lying upon the counter in his store being picked up by a South American, who was so impressed with it that when he returned to Montevideo at the end of February or the first of March, he took a copy with him, and promised to popularize the United States Pharmacopœia in Uruguay.

Mr. Mayo said it might be interesting to the members to know that the U. S. P. was selling steadily all over South America. The sales were by no means confined to Cuba and Porto Rico. Some sales had been made in the Argentine Republic, and a good many on the west coast of South America, and the sales had been quite steady. The sales during the last three months had nearly doubled the sales of the previous three. It was feared, after the sales of the Spanish translation dropped off after the first six months, that the demand had been supplied, but the sales of the past three months indicated renewed interest. It was also gratifying to note that these sales were quite general, practically all over South America, and especially on the west coast.

Mr. Wilbert thought one reason for this was the really excellent way in which the book had been translated. Spanish scholars were universal in their praise of the translation of the U. S. P. The language was excellent, the Spanish was pure, and scholars all over South America had noted that fact.

The final item on the program was the United States Pharmacopœia, by W. C. Alpers. Mr. Alpers was not present, and the Chair stated that, without objection, the paper would simply be read by title and referred, and it was so ordered :

THE PHARMACOPŒIA OF THE UNITED STATES.

BY WILLIAM C. ALPERS.

The U. S. Pharmacopœia, the book that we love and cherish more than any other worldly book, our true and faithful companion at our daily work, our guide through the difficulties and intricacies of our vocation, our pride as professional men, our most sacred treasure as pharmacists—how can I find words to describe and exalt this precious volume in a worthy way? To think of this book and its inexhaustible mine of knowledge and information arouses our enthusiasm, and fills us with emotion

and inspiration. For we see before us a work of such magnitude and beauty and—as far as possible—perfection, that no pharmacist whose heart has grasped the higher aims of our noble profession, can look upon it without that true inner satisfaction, that only faithful devotion to work and purpose can give. It is true, not every one will share this enthusiasm, and many will smile at what they think is mere exaggeration and uncalled-for idealism. There is the nagging critic to whom nothing is beautiful, grand nor sacred, and whose only enjoyment is the hunt for a small speck or stain to give him an excuse for spitting his venom on the whole work. There is the indolent and lazy whose mind is too sluggish to be aroused and elevated. There is the man of superficiality, who condemns first and examines afterwards, who is always in the negative and afterwards regrets his own doings. And there is the vast host of quiet pharmaceutical workers who suffer and moan under the weight of the adversities of our vocation and cannot find time and opportunity to uplift their eyes and take a more cheerful and encouraging view. All these do not share the enthusiasm that this glorious book inspires. To them it is nothing but a list of cold facts and statements, a mass of figures and formulæ, a dead volume for dead souls. Nor do they ever contribute to the revision or improvement of the Pharmacopœia or of pharmacy in general; they plod along in their treadmill, unconscious of the possibilities and beauties of mental recreation.

Nor stands our profession alone in this respect. Take the botanist. The dry observer of facts sees in a flower or tree only so many petals and stamens, a leaf of such a shape, a seed of such a construction. The real botanist perceives the whole plant as one perfect, a beautiful work of nature; his mind rejoices at its harmony and symmetry, and his heart opens with enthusiasm in the thankful conception that he has recognised and displayed one of the mysterious secrets of creative power. So also to the thinking and devoted pharmacist our Pharmacopœia is more than a list of facts. To him it is the history of his profession, the embodiment of pharmaceutical life, the plastic representation of everything that is worthy and noble in our existence. It has been said that pharmacy in the United States is fast running into pure commercialism, that there is nothing in it but drudgery, that professionalism and ethics are hollow words, that there are no higher aims and that a pharmaceutical ideal is an excrescence of sickly imagination. Glance at our book. Does that look like commercialism? Is not every page of it an appeal to professionalism? Is not every sentence a strong testimony of the brain work and depth of mind that has produced it? Nearly every formula, that has been brought down from former editions to the present one might elucidate the development and history of American pharmacy and might be used to demonstrate the progressive spirit of the profession. And this progressive spirit is the most notable instance of the difference between our Pharmacopœia and

those of European countries. The latter, too, show the history of pharmacy of their respective countries in a marked way, and many preparations therein remind us of the mysticism of the Middle Ages and show how the light of truth and science gradually broke through the veils of ignorance and prejudice. But there is written on every page a stubborn conservatism that clings to old formulæ and old ideas and yields only when there is absolutely no other outlook. Not so our book. It is enlivened by the spirit of progressiveness, of energy, of fervent desire for truth; it does not look back and cling to old traditions and mysterious fogies; its march is onward and upward.

In no country, therefore, does the Pharmacopœia represent in every detail the active life of the two professions, pharmacy and medicine. It is not, as some claim, the work of a few men; for even if the committee that finally decides on the various definitions and formulæ, consists only of ten or twelve men, these men do not, and cannot act according to their own desires or inclinations. To them is given a large amount of work, the result of the intelligent and thinking class of both professions. Whatever has been thought out and written and spoken of as a possible change or improvement of our Pharmacopœia during the last ten years is carefully collected. Abstracts are made from all journals of the world, from the proceedings of state and local associations, from the discourses and delineations of individuals. Where, in the whole world, for instance, is there such an office as that of the reporter on Progress of Pharmacy, who is the employee of our great Association? As we all know, it is his duty to collect whatever material is presented during these ten years, and his reports, therefore, represent the condensed accumulation of the progress in pharmacy and medicine.

It is a wonder that under these conditions our Pharmacopœia is largely superior as a progressive text-book to any similar book in the world.

A new element will enter from now in its making, the element of the large commercial interests. Formerly they sat quietly by when the students of pharmacy evolved the Pharmacopœia; but since the standards laid down in this book have been legalized by the action of Congress, they recognize the necessity of also influencing the work from their standpoint. There are some who think that this new influence will work detrimentally and harmfully to the further development of our Pharmacopœia. I do not think so, and rather believe that a new, valuable factor will be added to its further improvement.

In the standardization the counsels of men who know the market of the whole world and know the important influence that such standardization will have on commercial interests, cannot but be useful and helpful. We cannot expect to prepare medicine from drugs that are far beyond the commercial possibilities. There the different elements that make up pharmacy in the broadest sense from the cultivator of the drug to the

final dispenser of the finished product must all act together and be in harmony.

Thus, let our Pharmacopœia continue to be our pride and exalted guide: let us work together from one end of the country to the other in preserving and enlarging its beauty, its dignity, its usefulness, and let us take the highest and broadest view of its future. Sturdy work and high enthusiasm are required to accomplish this work. Let us not listen to the sneers of the skeptic who derides the ideal and laughs at enthusiasm. No great deed has ever been accomplished without the pioneer work of the idealist, which like the shining sun shows us our way. We never expect to call the sun our own and grasp its golden rays: but we follow its brilliancy, and its warmth gives us power and courage. So also will a high pharmaceutical ideal aid us to march forward, elevate our profession and make us strong in the adversities of the present, and hopeful for a glorious future. And the United States Pharmacopœia is the embodiment of this progressive and active ideal.

This ended the symposium, and the program for the session.

The Chair stated that he wanted to extend his thanks to all those who had contributed papers, and all those who had had the patience to listen to them. It was now almost midnight, and a motion to adjourn would be in order.

Mr. Hallberg said that before adjourning, he wanted to move that a vote of thanks be tendered the Chairman for this delightful and edifying Symposium on the Pharmacopœias of the World, and the motion was carried unanimously, by a vote put from the floor.

On motion of Mr. Wilbert, the Section then adjourned.

THIRD SESSION—SATURDAY MORNING, MAY 7, 1910.

The Section on Practical Pharmacy and Dispensing met pursuant to adjournment, at 10 o'clock, A. M., Chairman Otto Raubenheimer presiding.

The first paper on the program for the morning being one by Mr. Raubenheimer, he temporarily turned the Chair over to Mr. William R. White, Associate, while he read his paper on "Liniments."

U. S. P. AND N. F. LINIMENTS COMPARED WITH THOSE OF THE FOREIGN PHARMACOPŒIAS.

BY OTTO RAUBENHEIMER, BROOKLYN, N. Y.

On investigation I find that the origin of liniments does not date as far back as it is generally supposed to. Such an excellent book as *Traité de Pharmacie*, by Eugène Soubeiran, chief pharmacist of the hospitals of Paris, published in 1839, only devotes one small page to these galenical preparations. In a price schedule, a copy of which I have in my library, the *Herzoglich-Wirtembergische Medicinal-Ordnung*, Stuttgart, 1786, not

a single liniment is quoted. In the present comparative review the writer must necessarily reiterate parts of his previous papers on "The Liniments of the U. S. P."; "The Liniments of the N. F."; "Linimentum Ammoniaë, Snow White and Permanent." Nevertheless this paper will contain some new matter which has not been stated before, as liniments are one of my specialties and I have always kept track of the literature regarding this important group of galenicals. In order to avoid repetition, I beg to state that I have compared the U. S. P. and N. F. liniments with those of the following Pharmacopœias:

Austria VIII, 1906;
France V, 1908;
Germany IV, 1900;
Germany Ergaenzungsbuch III, 1906;
Great Britain IV, 1898;
Japan III, 1905;
Netherlands IV, 1905;
Russia, V, 1902, reprint of 1906;
Switzerland IV, 1907.

LINIMENTUM AMMONIÆ U. S. P. VIII.

The formula for this popular liniment has been changed in every revision of our, as well as most of the foreign pharmacopœias. This again proves how puzzling such a simple preparation can be in the hands of different pharmacists. Every Pharmacopœia employs different oils, viz., the oils which are most popular in their own country. It is undoubtedly due to this fact that the U. S. P. made a change from olive oil to cottonseed oil. And as this oil does not saponify very readily, a little oleic acid was added. To make the resulting liniment more fluid, a little alcohol was also added. But nevertheless this liniment thickens very much on keeping, and it is for this reason that the U. S. P. states: "This liniment should be freshly prepared when wanted." It is, however, impracticable to mix four ingredients together when 5 cents worth of "hartshorn liniment" is called for. As pointed out in my paper on "Linimentum Ammoniaë" all the latest pharmacopœias have adopted oil of sesame in the preparation of this liniment in the proportion of 3 to 4 parts of oil and 1 part of ammonia water. The Austrian Pharmacopœia which orders 20 parts ammonia water and 80 parts of sesame oil to be mixed by agitation in a bottle, describes this liniment as a white semi-fluid, of strong ammoniacal odor, which should not separate in two layers on standing. The Russian Pharmacopœia orders 3 parts of commercial olive oil (Provincialis); 1 part sesame oil and 1 part ammonia water, and states that this liniment must not separate into two layers, and that if it should thicken too much a few drops of alcohol should be added. The Japanese Pharmacopœia orders 1 part ammonia water and 4 parts sesame oil (the

same proportion as the Netherlands and the Austrian) with the directions to shake until a white homogeneous thick liquid is obtained. From experiments which I have conducted for years, I am prepared to make the statement that sesame oil is the proper oil to use in the preparation of ammonia liniment, because (1) it thus contains only two ingredients; (2) it can be prepared quickly and easily; (3) the resulting liniment is snow-white; (4) it is homogeneous and does not separate into two layers; (5) it has that proper creamy consistence, not too thick and not too thin; (6) it is permanent and will not thicken materially by age. Furthermore in my opinion it will be an advantage to order these ingredients which enter into this liniment by *weight* instead of by *volume*.

LINIMENTUM CALCIS U. S. P. VIII.

The French Codex orders equal parts by weight of olive oil and lime water; the British Pharmacopœia orders equal *volumes* of the same ingredients; the Japanese Pharmacopœia orders equal parts by weight of sesame oil and lime water; the Elenchus to the Austrian Pharmacopœia, the Swiss Pharmacopœia and the *Ergänzungsbuch* (supplement to the German Pharmacopœia) all order equal parts by weight of linseed oil and lime water. The last two authorities order this liniment to be freshly prepared when called for. When I questioned the necessity of this requirement in my correspondence with a German pharmaceutical authority I was informed that this was evidently done because the lime in the lime water employed would in time be changed to calcium carbonate. I cannot agree to this, because calcium hydroxide in saponifying linseed oil is changed to calcium linoleate. Furthermore, I find that this liniment actually improves by age, and last but not least, whenever carron oil is required for burns and scalds it is wanted in a great hurry. I would respectfully suggest to the Revision Committee that the ingredients in this liniment should be *weighed* instead of *measured*, being simpler and cleaner.

LINIMENTUM CAMPHORÆ VIII.

In my paper on the liniments of the U. S. P. I went into all the details, which it is not necessary to repeat. In all of the foreign Pharmacopœias this liniment is official under the title of "oleum camphoratum." As this preparation is generally called for by the public and mostly prescribed by the physicians under the title camphorated oil, this name most certainly should be given as a synonym in the next revision. I also want to call your attention that a number of cases of prosecution for adulterated camphorated oil have been thrown out of court because the U. S. P. did not contain this title or synonym. A great many of the pharmacopœias use sesame oil in the preparation of this liniment, which in my opinion is in the first place less gummy and sticky than cottonseed oil, and in the second place, a better solvent for camphor, so that it dissolves readily without

the application of heat. I also beg to call to your attention that the employment of heat in the present directions of the U. S. P. has been the direct cause for court decisions that this preparation cannot contain 20 per cent. camphor. The U. S. P. should, besides a short physical description, including specific gravity, also give an assay for determining the strength of camphor liniment. The Austrian Pharmacopœia, which orders 1 part of camphor and 3 parts of sesame oil, gives the following approximate method of determining the strength of oleum camphoratum: "When 10 Cc. of oleum camphoratum and 10 Cc. alcohol (90 per cent.) are well shaken together in a graduated tube, then the separated alcoholic layer should not measure less than 13 Cc." While this is not an exact assay, it will certainly serve as an approximate test which can be readily applied by the average pharmacist. Experiments in the application of this test to the U. S. P. camphor liniment are going on in my laboratory and will be published in due time.

LINIMENTUM CHLOROFORMI U. S. P. VIII.

This liniment is superior to the preparations of the foreign pharmacopœias which are mixtures of chloroform and some fatty oil. Our U. S. P. should give no method of determining the percentage of chloroform. The latter can readily be shaken out by centrifugal force.

LINIMENTUM OPII COMPOSITUM N. F. III.

In addition to my remarks in my former paper, I want to state the following: In tracing the origin of this liniment I came across a formula for Linimentum Canadense in the Manual of the N. Y. Pharmaceutical Society published in 1858, a copy of which I have here for your inspection. (This Manual can justly be called the forerunner of our National Formulary.)

Olei Menthæ piperitæ partem unam.

Tincturæ Opii partes duos.

Olei Terebinthinæ.

Alcohol Vini.

Liquoris Ammoniaci caustici ana partes octo.

Misce.

LINIMENTUM SAPONIS U. S. P. VIII.

I beg to call your attention to a cold-process Spanish olive oil soap which when grated will *readily* and *completely* dissolve in a mixture of alcohol and water, *without* the application of *heat*.

LINIMENTUM SAPONATO-CAMPHORATUM N. F. III.

This preparation is official in almost every pharmacopœia, its formula however differing very largely. The present N. F. formula which orders "White Castile" soap does not produce a satisfactory solid opodeldoc. Furthermore the stronger ammonia water in the N. F. formula should in my opinion be changed to ammonia water (10 per cent.) which is the in-

redient in the foreign pharmacopœial formulas. Very likely the Latin term *Liquor Ammonii Caustici*, which, however, is of 10 per cent. strength, was translated into Caustic Ammonia water of 28 per cent. The Dunning formula using stearic acid and sodium carbonate produces a very satisfactory opodeldoc. The Austrian Pharmacopœia also uses these ingredients with the addition of glycerin and the Swiss Pharmacopœia saponifies lard with the solution of sodium hydroxide, whilst the German Pharmacopœia employs "*Sapo Medicatus*" prepared by the saponification of equal parts of lard and olive oil with sodium hydroxide.

LINIMENTUM TEREBINTHINÆ ACETICUM N. F. III.

As pointed out in my paper on the liniments of the N. F., the thickening of this liniment can be readily prevented by using the yolk of 2 eggs and the albumen of one in place of the entire two eggs as required for twice the quantity of the present N. F. formula. The Swiss Pharmacopœia and also the supplement to the German Pharmacopœia direct to prepare this liniment by emulsifying 5 parts of olive oil with 15 parts of yolk of egg and the necessary water and then adding the oil of turpentine and acetic acid. The *Ergaenzungsbuch* calls this liniment "*Stokes*" which should, however, be *Stokes* as it was originated by Dr. William Stokes, of Dublin, the originator of Stokes Expectorant, who also brought the Withering treatment for dropsy, with digitalis, before the Medical Society of Edinburgh, and whose name is indelibly associated with medicine in the connection with the peculiar breathing known as the Cheyne-Stokes respiration.

Dr. Stokes and his expectorant.—G. B., New York.—Dr. William Stokes was born at Dublin, Ireland, in 1804. He was the son of a physician, Dr. Whitley Stokes, at that time a professor of medicine in the University of Dublin. William Stokes obtained his degree from the University of Edinburgh in 1825, and from the University of Dublin in 1839. For a time he was physician to Meath Hospital, associated with Dr. Robert J. Graves. He was the editor of the *Dublin Journal of Medical Science*, founded the Pathological Society in 1838, was physician to Queen Victoria in Ireland in 1861, a fellow of the Royal Society, and at one time president of the Royal Irish Academy. He succeeded his father as regius professor of physic at the University of Dublin.

Dr. Stokes was the author of a number of works upon the diseases of the chest and heart, both alone and in conjunction with Dr. Graves. In a footnote to one edition of his *Treatise on Diagnosis and Treatment of Diseases of the Chest*, edited by Hudson and published in 1882, is given the following formula for an expectorant:

Decoction of polygala senega	5 ounces.
Syrup of tolu	$\frac{1}{2}$ ounce.
Tincture of opium, camphorated	2 drams.
Tincture of squill	2 drams.
Ammonium carbonate	15 or 20 grains.

In this same work also is given a formula for a liniment to be used as an application in the treatment of bronchitis ; this is nearly identical with the formula for Stokes' liniment in the National Formulary, the amount of acetic acid being less in the original recipe and only the yolk of the egg being used.

In reply to the query, " How does his formula [for expectorant] happen to be in the National Formulary?" we would say that presumably it was adopted and changed by the National Formulary committee because that committee thought it worthy.

Besides the preparations mentioned there are several others in the N. F. which properly belong to the liniments, namely :

Tinctura Saponis Viridis Compositum N. F. III.

In as much as the title "*sapo viridis*" of the U. S. P. 1880 has been rightly changed to *sapo mollis* in the U. S. P. in 1890, and inasmuch as the title Tinctura Saponis Viridis of the U. S. P. 1880 has also been rightly changed to Linimentum Saponis Mollis in the U. S. P. 1890 therefore that old title Tinctura Saponis Viridis Compositum of N. F. I, II, III, should most certainly be changed in the next edition of our N. F. to the proper title corresponding to the Pharmacopœial title, viz., Linimentum Saponis Mollis Compositum.

Petrolatum Saponatum Liquidum.

I beg to call your attention to the many formulas in the Supplement to the German Pharmacopœia for medicated vasolimenta and quite especially to *Vasolimentum Iodatum* containing 10 per cent. iodine ; together with an excellent assay process.

Before closing I must not forget another class of liniments which, by the way, are one of my hobbies, namely :

OLEA INFUSA N. F. III.

And quite especially to *Oleum hyoscyami infusum* or as called by some of the foreign pharmacopœias *coctum*.

The process employed in the N. F. as well as the foreign pharmacopœias is the Eugen Dieterich method consisting of macerating the ground herb with ammoniated alcohol in order to liberate the alkaloids and then infusing with the oil. Olive oil was formerly used ; but sesame oil has replaced it in the latter Pharmacopœias and sesame oil should most certainly displace the mixture of lard oil and cottonseed oil in the N. F. Again I beg to point out my comments in the N. F. Committee (Bulletin A. Ph. A., Dec., 1909, page 483) that the Swiss Pharmacopœia orders this oil to be prepared in a copper vessel and describes it as clear and dark-green. In place of a copper vessel any ordinary dish will answer, if a few copper coins are added when the oil is infused. You will please notice the beautiful rich dark-green color of the submitted sample prepared according to the Swiss Pharmacopœia ; and, although color is said to be no criterion, I

am convinced that the physician as well as patient and customer would prefer such a preparation to one of brownish-green or greenish-brown color. The objection that this oil might contain copper has been nullified by the chemical examination of the oil by Prof. La Wall.

OLEUM HYOSCYAMI COMPOSITUM N. F. III.

The formula of the French Codex is a rather complex one, although not quite as complicated as the original formula for *Balsamum Tranquillum* quoted in Soubéiran's *Traité de Pharmacie*, which was an infused oil of six fresh and twelve dried drugs. The Swiss Pharmacopœia directs to prepare this oil by the addition of one Gm. each of oil of lavender flowers, peppermint, rosemary and thyme, to 1000 Gm. of ol. hyoscyami. The sample herewith submitted, which contains 10 drops of each of these oils in 100 Gm., I consider an improvement because it has more of an aromatic odor. The formula of N. F. III calls for 2 drops of each oil of absinth, lavender flowers, rosemary, sage and thyme to 100 Cc. of infused oil of hyoscyamus. By increasing the amount of essential oil from 2 to 10 drops, the aromatic odor can be greatly improved. The main benefit with this or a similar formula will be that the preparation can be made extemporaneously.

CONCLUSION AND SUGGESTIONS.

In conclusion I beg to state that taking it all in all, the formulas for the liniments of the U. S. P. and N. F. give very good satisfaction, and are the equal if not the superior of those of the foreign Pharmacopœias. It is our duty to follow our standard books, of which we can be justly proud, and which now actually have been made law books, and it is furthermore our duty to suggest improvements, if possible, to the revision committees of the U. S. P. and N. F.

THE ACTING CHAIRMAN: We have listened to this most excellent paper by Mr. Raubenheimer. Is there any discussion?

MR. HYNSON: I would like to ask Mr. Raubenheimer if he does not think it is well to use definite products instead of soap. I think if that can be done it should be, on all occasions. And I take occasion again, like I did in connection with what was said by my friend Beringer, for whom I have the profoundest respect for his ability, to call attention to the fact that Mr. Raubenheimer advises the use of copper coin in coloring these oils. That seems so foreign to the usual way he does such things that I cannot understand it.

MR. RAUBENHEIMER: Instead of using an indefinite substance use a definite compound, and follow the foreign Pharmacopœias. I have done so for years. Some soap is hard; some is soft—like Castile soap, which differs very much; so it is much better to use a definite article. Of course I do not suppose we will ever agree on copper coins. I think it is a very good thing, and if you make any infused oil like that, you have them brand new. That is the point, and the big point of it is that no one can find any copper in it. Copper is certainly a big advantage.

MR. HYNSON: Mr. Chairman, by sufferance I allowed you to read your paper, when I had the right of this floor, by action of this body. You will remember that you entertained a motion, and it was carried, that the report of the Committee on the Chairman's Address should take precedence at this session; and I now claim the right that was given us to bring before the Section the report of the Committee on the Chairman's Address.

THE CHAIRMAN: Certainly you can have it, Professor Hynson; but when we opened our meeting there were but a few of our members here, and I thought I would read my paper, as I am apt to be called away at any minute.

MR. HYNSON: I allowed you to read your paper first because I wanted to draw a crowd when the report was read.

The report of the Committee on Chairman's Address was then read.

REPORT OF COMMITTEE ON CHAIRMAN'S ADDRESS.

Your Committee on the Chairman's Address calls the especial attention of the entire membership of the Association to this most interesting paper and to the careful and able discussion of many of the problems confronting Pharmacy today: We believe that it is because the carefully thought out suggestions of such devotees to Pharmacy as your chairman are not sufficiently studied that better progress in pharmaceutical reforms have not been made: we believe that it is the non-discovery and non-adherence to *truth* that prevents the more ready attainment of our ideals; such truths as are so forcibly promulgated by Chairman Raubenheimer.

We believe with the chairman that the progress of pharmacy is greatly retarded by the duplicating of the same compound as specialties; the improper and incomplete labeling of new chemicals; the similarity of names or titles; the suggestions of manufacturers in their price lists and on other labels of the possibility of making galenicals by other than pharmacopoeial methods;—by the dilution of fluidextracts, which strangely enough is inconsistently endorsed by the several such formulas appearing in the U. S. P. and N. F.

We believe the latter hindrance needs the attention of the Association, manufacturing pharmacist and especially government and state officials who have to do with the enactment and enforcement of food and drugs laws—we believe the publication of such formulas pernicious and should be restricted.

We endorse and heartily present to the practising pharmacists of the Association the ten specific recommendations made by the Chairman: we also endorse the recommendations to the Association as being worthy of serious consideration by the Council and therefore respectfully call the attention of that body to the subjects as presented by the Chairman.

The unique suggestion of Dr. Bastedo regarding the *certification* of pharmacists to which the Chairman calls attention should not be allowed to pass and the suggestion is made that a special committee of this Section be formed to consider the subject, and report at the next annual meeting.

The Committee wishes to lend the Chairman all the encouragement his unselfish devotion to pharmacy and his abilities deserve.

Respectfully submitted,

HENRY P. HYNSON,
GEORGE M. BERINGER.

ACTING CHAIRMAN: You have listened to the report of the Committee on Chairman's Address. Is there any discussion of this report? If not, a motion will be entertained for its adoption.

MR. LADISH: I make a motion that the report be adopted, and that the recommendations be concurred in.

Motion seconded and carried.

MR. RAUBENHEIMER: I move that the Committee be discharged, with thanks.

Motion seconded and carried.

MR. RAUBENHEIMER: I am very thankful to the Committee. I was already getting a little nervous. Professor Hynson said he was going to begin to worry me, and there were some things in that address that I was a little worried about.

MR. WHITE: There was one thing that I noticed the Committee did not cover, and that was the Recipe Book. I did not notice any reference to that; it was the recommendation of the report of the Chairman that the Recipe Book be printed by the Association.

MR. HYNSON: Well, that was one of the recommendations that we endorsed, that it be referred to the Council, for consideration. We thought that the best way to dispose of it.

THE CHAIRMAN: The next in order is the report of the Nominating Committee. They are holding a session now, and I understand will be ready to report very soon. In the meantime we had better have a short paper read. Mr. Hynson, suppose you read your paper now.

MR. HYNSON: This paper, according to the regular rule, should not be read, but it is one of great interest, I think, and if there is no other paper ready, I will read it. You know this is a paper written by some one else.

EFFERVESCENCE.*

BY W. J. LOWRY, JR., BALTIMORE.

Effervescence is defined in the dictionary as: "Irrepressible excitement or emotion" and this definition may explain the immense popularity of a well-known proprietary effervescent preparation for the relief of the invariable headache in "the cold gray dawn of the morning after" an evening of irrepressible excitement or emotion on the homeopathic theory of: "Similia similibus curantur."

Whether this theory holds good or not, it can not be gainsaid that effervescence, as applied to cold liquids in a state of "irrepressible excitement or emotion" and intended as beverages, increases not only their palatability, but the bubbles of carbon dioxide have a tendency to act as letters of introduction to the stomach and cause the liquid to be a much more welcome guest than it might otherwise be.

If a pleasant beverage is made more pleasant by effervescence, then it is reasonable to presume that otherwise unpleasant medicine may be made pleasant or, at least, acceptable by these same bubbling "letters." This, then, being so, the administration of medicaments in effervescent form is

* Being the Chairman's report of a special committee, to which the Effervescent Salts of the National Formulary were referred, by "Sub-Committee V" and composed of Joel J. Barnett, W. A. Whittle and the author.

not only desirable but, in some cases, is the best way in which some remedies may be given.

The U. S. P. Effervescing Solution of Magnesium Citrate is an excellent illustration of this class of liquids and needs no comment. In addition to this, there are the N. F. solutions of magnesium sulphate, potassium citrate and sodium citro-tartrate.

These solutions can be easily prepared by the pharmacist, but granular powders which, when dissolved in water, cause effervescence, seem too great a task for the average apothecary to accomplish.

The use of this class of pharmaceuticals has increased to an enormous extent and every pharmacist should be in a position to prepare, not only U. S. P. and N. F. granular effervescent powders, but, also, any for which he has call or for which he can create demand.

As is well known, the effervescent powders are composed of the medicinal ingredient and alkaline bicarbonate (usually sodium bicarbonate) and either tartaric acid, citric acid, or both; the dry, fine powders being simply mixtures of the medicinal agent, sodium bicarbonate and tartaric acid. The *granular* powders, generally known as granular effervescent salts (and in this paper hereafter called G. E. salts) are a fused and dried mixture of the medicament, sodium bicarbonate and citric acid, or, the medicament, sodium bicarbonate, citric and tartaric acids. This is generally the case, but they are still prepared, in some cases, by moistening a mixture of tartaric acid, sodium bicarbonate and the medicament, with alcohol, and drying. Sugar is very often added. In some cases, to sweeten and in others to cheapen, but such salts are prone to change unless used in a short time.

The U. S. P. salts are an excellent line, with the exception that their citric acid content is too low to form good granules, while the N. F. G. E. salts are worthless and the working formulas are all wrong.

The *idea* of forming a neutral salt when saccharated citric or saccharated tartaric acid is mixed with an equal weight of saccharated sodium bicarbonate and dissolved, is a good one and if the quantity of citric acid be sufficient to form good, stable granules, their principle would be ideal; but, unfortunately, although they look very well on paper and the general process, as laid out in the N. F., would indicate plain sailing, they do not produce the results expected in practice.

One serious objection to the saccharates is the sugar; this never occurs in the natural mineral waters, for which the corresponding salts should furnish portable as well as potable substitutes, which the sweet solutions do not do. In the heating necessary to form the granules, the sugar is generally darkened; either immediately, as shown by the slight tinge of yellow, if great care be not exercised, or on standing for any length of time, even if no signs of discoloration appear when the salt is taken from the heat.

Sugar also dilutes the quantities of acid and alkali to such an extent that if the proportion of medicament is high, it is almost impossible to get a granule, and the resulting mixture has very little, if any, effervescing properties.

At least half the finished product should be effervescing base, in order to get a lively solution, though less may be used, on special occasions, but always at a sacrifice of rapid solution and of the amount of gas liberated.

The N. F. basis for dose is 90 grains, while 60 grains seem to be the popular quantity, so it is suggested that a dose of 60 grains be made the basis on which the medicinal ingredients be calculated and a smaller quantity of sodium tartrate and citrate will be given each time; for it seems there are cases in which too much of the alkaline citrates and tartrates are undesirable.

A serious objection to making the U. S. P. G. E. salts in any quantity at all is the order of mixing the ingredients. The citric acid should always be added last, on account of its hygroscopic nature, for if there be considerable humidity the powder will lump-up and cake and, when fused, will be full of very wet spots, the resulting granules being a mixture of very wet ones, with considerable fine powder.

Another decided objection is the stirring-up of the fusing powder; this should not be disturbed. The melting salt should not be touched until it has entirely fused. If, after about four minutes, it seems all right, feel it by gathering a small lump in the hand. If it is of the proper consistency, take it out and hustle it through a sieve in a hurry; if it is not just right, the door should be promptly closed; it should not be kept open a second longer than necessary. Feel every two or three minutes until it is just right.

It is not best to make G. E. salts that are to be kept for any length of time, when the humidity is much beyond normal, as even short exposure to the air, after taking from the oven and while filling the container, may be enough to cause the salt to become damp. If the medicinal ingredient contains water of crystallization, use the proper amount of the anhydrous equivalent and if this be large, it may be necessary to increase the quantity of citric acid, always neutralizing the increase with sodium bicarbonate, decreasing the tartaric acid. For all practical purposes one part of citric acid requires one and one-fifth parts of sodium bicarbonate (1 to 1.2).

GENERAL DIRECTIONS FOR GRANULAR EFFERVESCENT SALTS.

Conditions of powders: These should all be of number 60 degree of fineness. Pass the sodium bicarbonate through a No. 24 or 30 sieve, then the medicament; the tartaric acid is next passed through and these powders mixed; lastly pass the citric acid through and then mix the whole batch thoroughly.

FOR GRANULATING IN AN OVEN.

Spread the powder evenly, about $\frac{3}{8}$ inch thick, on a sheet of paper, on a canvas tray, a glass plate or a shallow porcelain or enameled-ware dish. Then place in an oven heated to not less than 95° C. and not over 105° C., and allow it to remain there, *but without stirring*, until of the consistency of fresh bread, not quite pasty, but too moist to be dry and too dry to be moist (this is the critical period). Immediately transfer to a No. 5 or 6 sieve and force through (on the few hard granules that usually are formed; you may have to use a pestle). Spread out the granules on the tray and dry in the oven at a temperature not exceeding 50° C. The length of time required for the drying-out depends on the atmospheric conditions and may take from three to six hours. When dry, pass through a No. 6 or 8 sieve and transfer to air-tight containers and keep securely closed, in a dry place.

TO GRANULATE ON A WATER-BATH.

The N. F. plan of placing the mixed powders in a water-bath and stirring till dry, is a very quick method for small quantities, at the dispensing counter and where small (say No. 10) granules are suitable; it is an excellent way of proceeding. In these experiments, close to one hundred different 100 Gm. lots of salts were made by the N. F. process, but with the readjusted formulas. These granulations required about ten minutes, from the time of placing the powder in the *briskly boiling* water-bath (an ordinary agate-ware, double oatmeal boiler was used) to produce perfectly dry granules, which were passed through a No. 8 sieve and immediately bottled.

Some of these salts, made seven months ago, are "as good as new" today and not a lot that was experimentally successful, has gone bad.

With experience had in making thousands of pounds of G. E. salts and the experience gained in making salts on a very small scale, in preparing this paper, it is recommended that the oven method be used for all large quantities and the water-bath method be used for small quantities, say from 100 to 250 Gm.

As the result of numbers of experiments with an effervescing base for G. E. salts, made according to the oven method, it was found that the amount of citric acid necessary to form good granules should be about 25 per cent. of the calculated yield. If one pound is to be made, 4 ounces of citric acid will be required and as there is a loss of both water and carbon dioxide, it will be necessary to use more than one pound of powder, in order to yield the pound. Experience has taught that from 110 to 120 parts of powder will yield 100 parts of finished product and, in these formulas, 115 and 120 parts are calculated to yield 100 parts.

As an effervescing base, the following is suggested, for *oven* granulation :

Citric acid	26.0 parts.
Sodium bicarbonate	30.0 "
Tartaric acid, $0.47 \times 60 =$	28.2 "
Sodium bicarbonate, $0.53 \times 60 =$	31.8 "
Weight before fusing	115.0 "
Loss of water and carbon dioxide	15.0 "
Yield after fusing and drying	100.0 "

In order to simplify the calculations, 100 parts are made and, in order to make this quantity, 25 parts of citric acid must be used to form the granules. To practically neutralize this will require 30 parts of sodium bicarbonate. These 25 parts + the 30 parts, give 55 parts, that are absolutely necessary. There is then required the difference between 115 and 55 parts, or 60 parts of a mixture of tartaric acid and sodium bicarbonate, each part of which contains 0.53 parts of sodium bicarbonate and 0.47 parts of tartaric acid, therefore, $60 \times 0.53 = 31.8$ parts of sodium bicarbonate and $60 \times 0.47 = 28.2$ parts of tartaric acid.

The appearance of sodium bicarbonate twice in the formula may seem peculiar, but when a salt containing a medicament is to be made, this will be explained. For example: Wanted, 1 pound of a G. E. salt containing 5 grains of potassium bromide to each 60 grains, to be granulated in an oven.

Citric acid, 25×70 parts (1 lb. = 7000 grs. — 7000 ÷ 100 = 70)	1750 grs.
Sodium bicarbonate, 30×70 parts (1 lb. = 7000 grs. — 7000 ÷ 100 = 70)	2100 grs.
Potassium bromide	583 grs.

$1750 + 2100 + 583 = 4433$ grains of the three ingredients above, subtracted from $115 \times 70 = 8050$, the calculated yield, equals 3617 grains of the tartaric acid and sodium bicarbonate mixture.

Tartaric acid, $.47 \times 3617 =$	1700 grs.
Sodium bicarbonate, $.53 \times 3617 =$	1917 grs.
Total weight of powder in formula $115 \times 70 =$	8050 grs.
Loss of carbon dioxide and water $15 \times 70 =$	1050 grs.
Yield 1 pound or	7000 grs.

As an effervescing base for small quantities to be made in a *water-bath* and finished up before removing from the heat; particularly for use at the dispensing counter, the following is proposed:

Citric acid	16.5 parts
Sodium bicarbonate	20.0 parts
Tartaric acid, $.47 \times 83.5 =$	39.25 parts
Sodium bicarbonate, $.53 \times 83.5 =$	44.25 parts
Weight before fusing	120.00 parts
Loss of carbon dioxide and water	20.00 parts
Yield after fusing and drying	100.00 parts

In order to simplify the calculations, 100 parts are used and in order to make this quantity, 16.5 parts of citric acid must be used to form the granules; to practically neutralize this will require 20 parts of sodium bicarbonate. These 16.5 parts plus the 20 parts, give 36.5 parts that are absolutely necessary. There is then required the difference between 120 and 36.5 or 83.5 parts of a mixture of tartaric acid and sodium bicarbonate—each part of which contains 0.53 part of sodium bicarbonate and 0.47 part of tartaric acid, therefore, $83.5 \times .53 = 44.25$ parts of sodium bicarbonate and $83.5 \times .47 = 39.25$ parts of tartaric acid.

An example of a G. E. salt made according to the above, follows: Wanted: 4 ounces G. E. salt, containing 1 grain of caffeine, citrated, and 10 grains of sodium bromide in each 60 grains. Consider 4 ounces 1800 grains in order to simplify matters.

Citric acid, 16.5×18 parts = $(1800 \div 100 = 18) =$	297 grs.
Sodium bicarbonate, 20.0×18 parts = $(1800 \div 100 = 18) =$..	360 grs.
Caffeine, citrated	30 grs.
Sodium bromide	300 grs.
Tartaric acid, $0.47 \times 1173 =$	552 grs.
Sodium bicarbonate $0.53 \times 1173 =$	622 grs.
	<hr/> 2161 grs.
$(297 + 360 + 30 + 300 = 987. \quad 2160 - 987 = 1173).$	
Powder before fusing $120 \times 18 =$	2160 grs.
Loss of carbon dioxide and water $20 \times 18 =$	<hr/> 360 grs.
Yield practically 4 ounces or	1800 grs.
$1800 \div 60 = 30$ —60 grain doses.... $30 \times 1 = 30$ grs. caffeine citrated.	
$1800 \div 60 = 30$ —60 grain doses.... $30 \times 10 = 300$ grs. sodium bromide.	

With these two bases, it is possible to make a full line of G. E. salts and below will be found formulas for most of the N. F. salts and for a few others which have come into popular use.

As effervescent citrate of iron and quinine and effervescent phosphate of iron are so rarely called for and are so very difficult to make and to handle, it is suggested that they be dropped.

Granular Effervescent Artificial Carlsbad Salt.

Small quantities on water-bath.		Large quantities in oven.	
Citric acid	16.5 Gms.		250 Gms.
Sodium bicarbonate	20.0 "		300 "
Carlsbad salt, artificial	26.66 "		400 "
Tartaric acid $(.47 \times 56.84 =)$	26.715 "	$.47 \times 334 = 157$	"
Sodium bicarbonate $(.53 \times 56.84 =)$..	30.125 "	$.53 \times 334 = 177$	"
	<hr/>		<hr/>
To yield 100 Gms.		To yield 1000 Gms.	

Granular Effervescent Artificial Kissingen Salt.

Citric acid	16.5 Gms.		250 Gms.
Sodium bicarbonate	20.0 "		300 "
Kissingen Salt, Artificial	40.0 "		400 "
Tartaric acid $(0.47 \times 43.5 =)$	20.455 "	$0.47 \times 200 = 94$	"
Sodium bicarbonate $(0.53 \times 43.5 =)$..	23.055 "	$0.53 \times 200 = 106$	"
	<hr/>		<hr/>
To yield 100 Gms.		To yield 1000 Gms.	

Granular Effervescent Artificial Vichy Salt.

Citric acid.....	16.5	Gms.	250	Gms.
Sodium bicarbonate	20.0	"	300	"
Vichy salt, artificial.....	25.0	"	250	"
Tartaric acid ($0.47 \times 58.5 =$)	27.495	"	$0.47 \times 350 =$	164.5
Sodium bicarbonate ($0.53 \times 58.5 =$) ..	31.005	"	$0.52 \times 350 =$	185.5
To yield 100 Gms.			To yield 1000 Gms.	

Granular Effervescent Artificial Vichy Salt with Lithium.

Citric acid.....	16.5	Gms.	250	Gms.
Sodium bicarbonate.....	20.0	"	300	"
Vichy salt, artificial.....	25.0	"	250	"
Lithium citrate.....	8.33	"	83.3	"
Tartaric acid ($0.47 \times 50.17 =$).....	23.58	"	$(0.47 \times 266.7 =)$	125.35
Sodium bicarbonate ($0.53 \times 50.17 =$) ..	26.59	"	$(0.53 \times 266.7 =)$	141.35
To yield 100 "			To yield 1000 "	

Granular Effervescent Potassium Bromide.

Citric acid.....	16.5	Gms.	250	Gms.
Sodium bicarbonate.....	20.0	"	300	"
Potassium bromide.....	16.666	"	166.66	"
Tartaric acid ($0.47 \times 66.84 =$).....	31.41	"	$(0.47 \times 433.4 =)$	203.7
Sodium bicarbonate ($.53 \times 66.84 =$) ..	35.43	"	$(0.53 \times 433.4 =)$	229.7
To yield 100 "			To yield 1000 "	

Concentrated Granular Effervescent Sodium Phosphate.

Citric acid.....	20.0	Gms.	275	Gms.
Sodium bicarbonate.....	24.0	"	330	"
Sodium phosphate, anhydrous.....	40.0	"	400	"
Tartaric acid ($.47 \times 31 =$).....	14.57	"	$(.47 \times 95 =)$	44.65
Sodium bicarbonate ($.53 \times 31 =$) ..	16.43	"	$(.53 \times 95 =)$	50.35
To yield 100 "			To yield 1000 "	

NOTE.—The large quantity of the *dry* sodium phosphate requires a larger amount of citric acid, hence the increase.

Alkaline Granular Effervescent Lithium, Potassium and Caffeine.

Citric acid...	16.5	Gms.	250	Gms.
Sodium bicarbonate.....	20.0	"	300	"
Caffeine	0.833	"	8.33	"
Potassium bicarbonate.....	8.333	"	83.33	"
Lithium carbonate.....	4.166	"	41.66	"
Tartaric acid ($.47 \times 61.835 =$).....	29.06	"	$(.47 \times 383.35 =)$	180.17
Sodium bicarbonate ($0.53 \times 61.8 =$) ..	32.78	"	$(.53 \times 383.35 =)$	203.18
To yield 100 "			To yield 1000 "	

A final caution.—Be sure that the citric acid used has been recently powdered from perfect crystals which have not *effloresced*; never use any other kind.

MR. HYNSON: As I have said, that paper was not mine; but I believe these young men are members of the Association, and have done a great deal of work on this subject. I think it would be well if the special attention of the National Formulary Committee were called to it.

THE CHAIRMAN: I will entertain a motion that the paper be accepted and take the usual course; and also be referred to the National Formulary Committee. If there is no objection, it will be so ordered.

The next paper is on "Syrups" by Mr. Beringer.

MR. BERINGER: I have not a very elaborate paper on this subject, but I think there are a few points that ought to be brought out.

THE SYRUPS OF THE UNITED STATES PHARMACOPŒIA COMPARED
WITH THOSE OF SOME OF THE IMPORTANT FOREIGN
PHARMACOPŒIAS.

BY GEO. M. BERINGER.

A comparative study of the methods adopted by the various pharmacopœias is always of value as not only indicating the practice in those countries but also how some of the problems that are common to all are handled and in this we may find ideas that are well worthy of adoption in our own. For the present study of the official syrups the following pharmacopœias have been compared with the U. S. P. and the syrups as a class tabulated: The British 1898, the German 1900, the French 1908, the Swiss or Helvetica 1907, the Austrian 1906, the Danish 1907, the Swedish 1901, the Italian 1909 and the Spanish 1905.

The number of substances exhibited in the form of syrup varies greatly in these works and possibly indicates the prevailing preference of certain nationalities for sweet things. The French leads with 51 titles devoted to the class; the Spanish comes next with 50 and the Swiss has 31; the United States has 29; the Italian 24; the British and Austrian each 22; the German 18; the Swedish 16; and the Danish only 10.

The variety of medications exhibited in this form in the new French Codex is remarkable as it embraces not only the usual complement of saccharine solutions of chemical medicaments but also a number of drugs of vegetable origin that are not commonly exhibited in this form such as aconite and valerian.

The comparison shows that there are very few syrups indeed that are common to all of these pharmacopœias as only three such can be named, namely, simple syrup, syrup of orange peel and syrup iodide of iron. A few are common to a majority, some to several and quite a number are peculiar to the one country only. Among such we may illustrate the U. S. P. compound syrup of squill, and the aromatic syrup of rhubarb is likewise not mentioned in the other works. Many of the syrups that are popular in this country and which we might very properly suppose were universally used appear to be scarcely known abroad. Syrup of tolu does

not appear in either the German or Austrian Pharmacopœia and even syrup of ipecac is omitted from both the British and Danish and syrup of wild cherry is only recognized in the U. S. P. and British and the same is true of syrup of squill, and it is surprising to note that the British does not recognize syrup of ipecacuanha. The recognition of certain formulas by a limited number of pharmacopœias may indicate the territorial use ; thus syrup of peppermint is in the German, Swiss and Austrian, leading to a belief that its use is largely in central Europe ; and the same is shown in syrup of maidenhair fern official in the French and Swiss.

The popular use of syrups as a vehicle or adjuvant is shown in all of these pharmacopœias by what are really only flavored saccharine solutions. In the U. S. P. we have for this purpose citric acid, almond, orange, orange-flower, rose, tolu and ginger syrups, but the other aromatic syrups and especially the fruit syrups like cherry, raspberry, red currant, mulberry, and quince are neglected although a number of these are certainly worthy of attention and use. The National Formulary has attempted to supply formulas for only very few of these. In these flavoring syrups one can detect certain peculiar national likings ; for example, aromatic syrup in the British and the syrup of fresh blue violet petals, and the syrup of the dried violets in the Spanish.

The nomenclature and arrangement of the formulas of the U. S. P. must be approved as superior to most of these foreign works. The method adopted in the French and Spanish Pharmacopœias of arranging the formulas under the vernacular names and giving the Latin titles as sub-titles does not appeal to us. The nomenclature of the U. S. P. has been criticised in some quarters, but on examination of our official titles we are convinced that we are as near correct and in the main as uniform and harmonious in style of title as are most of the foreign. There is not that uniformity and harmony among the foreign that the critics of the U. S. P. would lead us to infer. It is quite possible that when the lexicographers of all the nations will agree as to the gender and declensions of the numerous nouns used as drug names that we will then have a basis for universal titles and the lack of harmony in this respect may be then removed from the pharmacopœias. Recently it was suggested that the U. S. P. should change the Latin title "Syrupus" to "Sirupus" and it was argued that the latter was the title of most of the continental pharmacopœias. As a matter of fact the German, Swiss and Italian use "Sirupus" and the British, French, Austrian, Danish, Swedish and Spanish agree with the U. S. P. in using "Syrupus." As to harmony of titles a few examples will show how this is non-existent : The Ph. Gr. uses *Sirupus Amygdalarum*, the Ph. Aus. *Syrupus Amygdalinus* and the Ph. Fr. *Syrupus Amydalæ*, the Ph. Hl. has *Sirupus Mannæ Compositus*, the Ph. As. *Syrupus Sennæ Compositus*, the Ph. It. has *Sirupus Sennæ et Mannæ*, and the Ph. Dn., and the Ph. Sv. each use *Syrupus Sennæ Mannatus* for their modifications

of the same formula ; for syrup of red currant the Ph. Fr. has *Syrupus Ribis Fructus*, the Ph. As. *Syrupus Ribium*, and the Ph. Hs. *Syrupus Grossulariae* and one has only to examine the latinized titles for such words as "phosphate," "hypophosphite," and "iodide" to be convinced that international harmony in official titles is as yet a myth.

The European method of weighing liquids as well as solids and the finished product is recognized in the U. S. P. only in the syrup iodide of iron. It is notable, however, that this idea has received such extended use in many of the British formulas for syrups. As a principle leading to accuracy of dosage this has a very serious defect. If through carelessness on the part of the operator there is a variation in the density of the syrup or any of the other ingredients, then there will be a variation in the volume and a corresponding variation in the calculated dose ; again it must be based upon the presumption that the prescriber has continuously well in mind the percentage strengths and gravities of the liquids directed. As this is, of course, far from the fact there must be introduced in each prescription an element of uncertain dosage.

USE OF DISTILLED WATER.

It is to be noted that some of the foreign pharmacopœias as well as the United States are not careful to direct distilled water in the making of syrups, and the U. S. P. is deficient in several instances where this is an important item. Notably in the syrup of hydriodic acid where water is directed instead of distilled water, which in this syrup is particularly important. The Danish Pharmacopœia is a model in this respect.

THERAPEUTIC TITLES.

The N. F. especially has been criticized for the use of titles that might be construed as indicating therapeutic value. The foreign pharmacopœias are far from free of this same criticism. For instance, the French has as a title, *Syrupus Anthelminticus* and *Syrupus Diureticus Compositus*, and both the French and Austrian, *Syrupus Pectoralis*.

PREPARATION FOR DRUG.

While the U. S. P. has now generally adopted the principle of making syrups like rhubarb and senega and ipecac from the fluidextracts, it is characteristic of the most foreign pharmacopœias that they direct such preparations to be made direct from the drug and this principle to compel the pharmacist to prepare his own official formulas throughout is noted in all of these pharmacopœias.

USE OF GLYCERIN IN SYRUPS.

The writer has elsewhere called attention to the advantage secured in extracting and permanency of some of the syrups by addition of some glycerin. It is noted that this idea is being introduced in some of the

foreign pharmacopœias, especially in the Pharmacopœia Helvetica where it is used in several of the official formulas.

SYRUPUS.

The official syrup is called Syrupus Sacchari in the Ph. Dan. and Ph. Sv. "Simplex" in the Ph. Gr., Ph. Fr., Ph. Hl., Ph. Aus., and Ph. His. The formula is practically the same in all with the stated sp. gr. varying from 1.30 to 1.35. It is to be noted that in some of these foreign authorities distilled water is not directed. The U. S. P. should include, however, tests for glucose or inverted sugar.

SYRUPUS AMYGDALÆ.

In several of the foreign pharmacopœias this syrup is an emulsion of either sweet almond or the sweet and bitter almond mixed. The U. S. P. VIII has made a radical change in this formula although that had previously also used the emulsion formula. In the last revision the syrup of almond was changed to merely syrup flavored with orange-flower water and a small quantity of spirit of bitter almond. The quantity of almond is too small and the flavor soon undergoes change. It in no wise resembles the foreign formulas, and as this is more frequently prescribed by foreign physicians or used in filling prescriptions written abroad, it is apparent that the marked difference in character is apt to cause comment with customers. It is believed that the pharmacopœia should return to formula of the U. S. P. 1890.

SYRUPUS FERRI IODIDI.

In this preparation the U. S. P. has conformed to the international formula recommended by the Brussels Conference, and most of the foreign pharmacopœias have followed the same, but it is notable that the French Pharmacopœia, recently issued, still retains a syrup iodide of iron, as *syrupus ferri iodidi gallicus* containing only .5 per cent. of ferrous iodide, and then publishes in the appendix the entire articles of the Brussels protocol. The Ph. Br., however, has not been revised since this international conference, and this still retains the 10 per-cent. ferrous iodide syrup. The U. S. P. uses hypophosphorous acid as a preservative in this preparation, but it likewise should direct that it be added only after the solution has become cool, as added when hot decomposition will ensue. It is noteworthy that the Ph. Hl. and Ph. Aus. each directs citric acid for this purpose and the French Codex tartaric acid; the others omit preservatives.

SYRUPUS IPECACUANHÆ.

The formula of the Brussels Conference is adopted only in the Ph. Hl., Ph. Aus. and Ph. Ital. The new French Codex directs that it be prepared from the solid extract and the German directly from the drug representing 1 per cent. The U. S. P. is by far the strongest, as it uses 7 per cent. fluidextract by volume.

SYRUPUS LACTUCARII.

I have already commented on this syrup in a paper before the New Jersey Pharmaceutical Association, 1909.

SYRUPUS ROSÆ.

I have already commented on this syrup in a paper before the New Jersey Pharmaceutical Association, 1909.

SYRUPUS PRUNI VIRGINIANÆ.

The present formula is not entirely satisfactory as the drug is not percolated to the extent that it should be for extraction, and there is an excess of glycerin used in this preparation. The results of experiments now being made on this syrup will be reported later.

SYRUPUS SENEGÆ.

This is a sample of formula directed by the foreign pharmacopœias to be made by direct infusion of the ground drug or percolation with weak alcohol.

SYRUPUS TOLUTANUS.

Several of the foreign pharmacopœias have Syrupus Balsamum Tolutanum, and they very commonly direct that it be prepared from the balsam infused with water and sugar added to the filtered infusion.

THE CHAIRMAN: Ladies and gentlemen, you have heard that excellent paper of our friend Beringer. Whenever Mr. Beringer writes a paper, he writes a good one. Now is there any discussion? I hope there will be. Mr. Dunning is one of these experts on Syrups.

MR. GOOD: I wish to ask Mr. Beringer a few questions, and make some comments on these Syrups. First, as to the spelling of "Syrup" in the French Codex.

MR. BERINGER: The French Codex for 1908 gives simply "Syrupus."

MR. GOOD: I have frequently had prescriptions from a French physician, and he spelled it "Sirop." I have had a great deal of satisfaction in the use of the present formula for Syrup of Almond, from the fact that I so rarely have a prescription for it, that making it in the old way I was obliged to retain the prescription for an hour or two before it would be completed.

MR. SASS: I would like to ask Mr. Beringer if he has made any experiments as to Syrup of Hypophosphites.

MR. BERINGER: I think that the formula for that is absolutely impracticable. My remedy for that is to cut down the amount of sugar and increase the amount of water. That is the modification which I think will have to be made in that formula.

MR. SASS: The experiments I have had with syrup of hypophosphites: We are making about 16 liters at a time, and have had a great deal of trouble. But since that time I have added 1 Cc. of lactic acid to each liter of the syrup and have had no trouble whatever. It keeps well. With the compound syrup of hypophosphites also I had some trouble. I found it necessary to increase the amount of sugar and decrease the water, because if you use the same amount of water it will make more syrup than the

Pharmacopœia calls for. I used 810 Gms. of sugar instead of .775. Since that time I have had no trouble in keeping it. I also make about 16 liters at a time, and I get very clear, nice yellow-colored syrup. Once I kept a bottle for about eight months; I made it in winter and kept it until late in summer, and the syrup was just as clear and fresh as could be.

MR. DUNNING: I desire to speak a few words in reference to syrup of hypophosphites compound, because I am somewhat familiar with the question. I believe I suggested the present formula to the revision committee, but I did not suggest the amount of sugar directed in the formula. I think I suggested 850 Gms. of sugar, which makes a saturated solution. I believe this formula to be satisfactory as I have been using it for some eight or ten years, and have had no trouble, whatever. If the amount of sugar be reduced, then there will certainly be some precipitation and growth. If the sugar is increased, however, as this gentleman suggests, the water must be decreased; otherwise the volume will be greater than it should be.

MR. ———: Then as to directions how the syrup should be made, I don't think it necessary to say that this syrup should be made by percolation. You can not make it of the U. S. P. strength by percolation, because when the solution comes in contact with the sugar, and becomes saturated, a good deal of the hypophosphite salts will be left on the cotton. I think the proper way to make it is by adding sugar to the solution and shaking it until it dissolves, and then filter it. If you filter either one of these syrups then you will have a perfectly clear syrup.

THE CHAIRMAN: The way I have been in the habit of doing is to have the solution perfectly clear first, and then you will have a perfectly clear syrup.

MR. COOK: I have had considerable experience in making tincture of lactucarium and difficulty in securing a suitable benzin. The tincture of lactucarium on the market contains considerable resinous matter, and it is impossible to filter it out. On the question of benzin, there is considerable difficulty in getting this in a small way. A large dealer can go to a dealer in oil, and buy a quantity of it, but in order to buy by the quart or gallon it is almost impossible, in our experience. We can not buy from the wholesale houses. Several years ago we went into this question quite elaborately, and had one of our men go down to the refinery and there secure five gallons of this benzin. They drew it off in such a way, however, that the product was contaminated. They had a long pipe which they used to draw from many tanks of different degrees. We were compelled of course to redistill, and get the proper fraction, and this of course you can not do unless you have the proper apparatus for redistilling. It is questionable whether the process as it stands to-day should remain, if there is a process so simple as Mr. Beringer recommended as satisfactory.

THE CHAIRMAN: In connection with this benzin question I might tell a joke, and that is that the Standard Oil Company has a big tank, with three taps to it. When you go there for benzin you get it out of one tap; for naphtha out of another, and for gasoline out of a third; but they all come out of the same tank.

MR. BERINGER: I will say that now that the chemical manufacturers have taken up the subject of a purified benzin it has become a commercial article, and I think the pharmacist will find no trouble in getting it.

MR. WHITE: I make a motion that we receive the paper of Mr. Beringer, with thanks.

Motion seconded and carried.

THE CHAIRMAN: The next paper is by Mr. E. F. Cook on "A Comparison of the Tinctures of the World.

Mr. Cook here read his paper, at the same time exhibiting a number of samples.

A COMPARISON OF THE TINCTURES OF THE MORE IMPORTANT PHARMACOPŒIAS OF THE WORLD.

BY E. FULLERTON COOK, P. D.

For the purpose of comparing the formulas for tinctures in the United States Pharmacopœia with corresponding preparations used throughout the world, the essential facts about each preparation, as it appears in the foreign pharmacopœias, have been collected. This compilation includes the official Latin title, the title commonly used in the country where it is official, the number of grammes of drug in 1000 Cc. of tincture, the menstruum, the process for preparation, the standard by assay, if any, and identity tests. The pharmacopœias examined are: United States, 8th Revision; Belgium, 1906; British, 1898; French, 1908; German, 1900; Netherlands, 1905; Japanese, 1907; Spanish, 1905; Swedish 1908 and Swiss, 1907.

DEFINITION.

The term tincture has long been recognized to mean an alcoholic preparation, containing the extractive matter or the active constituent of a drug. While this is the usual acceptation of the term, there have been many exceptions. In the pharmacopœias of the world the title of tincture is applied variously to infusions, spirits, acid solutions, toothache drops, simple solutions of chemicals, etc.

Where the title has been used in a foreign pharmacopœia for a simple infusion, as is in the Spanish, or for other preparations not strictly a tincture, they have not been included in this compilation, because there would be no corresponding tinctures in the other books.

PROCESS.

The United States and British Pharmacopœias are the only books which give in detail, under each preparation, the directions for manufacture. There the effort has been made to complete each article so that it can be independent of any other article. In all of the other pharmacopœias a general article precedes the class or is given elsewhere in the book, outlining the several processes and reference is then usually made under each tincture to the particular type process to be followed.

In the United States Pharmacopœia the percolation process is directed in all instances where the material is adapted to such a process, arnica being an exception. For such drugs as aloes, tolu and myrrh which cannot easily be percolated, maceration is directed. In the foreign pharmacopœias, however, maceration is usually given the preference and directed

to be used, excepting in those tinctures which were recognized by the International Conference, where percolation was recommended. It is true that percolation is directed in some instances and in the Belgian and Dutch Pharm., either process may be used in most cases, but percolation has not been generally introduced.

IDENTIFICATION TESTS.

One of the peculiarities of some foreign pharmacopœias which is not a part of the text in any of the United States Pharmacopœia articles, is the introduction of identity tests based upon color, odor and taste. Such identity tests are used in the French, Swiss, German, Japanese and Dutch Pharmacopœias. Another type of test given in the French, German and Swiss Pharmacopœias, under certain tinctures, is the effect when they are mixed with varying proportions of water. In others the specific gravity is given and in the Dutch the per cent. of extract when the tincture is evaporated. In a few instances in those preparations which contain chemical substances, chemical tests are included.

These identity tests, especially those of color, odor and taste, have never found a place in the United States Pharmacopœia and seem to the writer to have little value. The difficulty in describing a color exactly, is well known, and is illustrated by the difference in the description of the same tincture in several pharmacopœias. For example: Tincture of *Digitalis*:

French: "Yellowish-green."

German: "Dark greenish-brown."

Japanese: "Brownish-green."

Swiss: "Green when fresh, later greenish-brown."

The possible variation in color is so great for normal drugs that an exact shade can never be accurately described or demanded.

In the description of odor and taste the usual wording is "like that of the Drug"; or "characteristic," "bitter," "spicy," etc. Such tests can be of little value in establishing standards of strength or purity, and the United States Pharmacopœia has wisely excluded them.

ASSAY.

Assay processes are only given in a few cases in the foreign pharmacopœias, although where the International Conference has adopted an assay standard, this standard is usually a requirement.

INTERNATIONAL STANDARDS.

The influence of the standards adopted by the Brussels Conference, of 1902, for potent remedies, is well illustrated in this class of preparations. Twenty-eight of the tinctures in the United States Pharmacopœia were changed in strength to correspond to the international standard and practically all of the pharmacopœias of the world, which have been revised since 1902, conform to those standards.

The numerous changes in the United States Pharmacopœia were for the purpose of securing a compliance with the general principles adopted for tinctures at that Conference : namely, that all tinctures of potent or active medicinal substances should contain 10 grammes of the drug in 100 Cc. tincture. All others to contain 20 grammes of drug in 100 Cc.

It may be of interest to mention that in the British Pharmacopœia the drug strength is so adjusted for tinctures that there may be a uniformity in the dosage. I desire to acknowledge assistance in translation of M. S. Cook, H. S. Cook and O. W. Osterlund.

The compilation herein described, covering about 100 pages, was, by motion in the "Section," referred to the U. S. Pharmacopœial Revision Committee, since it was too elaborate to reproduce in the "Proceedings" in its original form, and an abstract would be impracticable, the compilation itself consisting of abstracts from the Pharmacopœias mentioned.

THE CHAIRMAN: You have heard the paper of Mr. Cook; it is before you, and also the samples. He has done some very good work for the Pharmacopœial Revision Committee, and the profession at large.

MR. BERINGER: I have always said that strophanthus should be exhausted first of all with purified benzin. Of course you cannot extract the fat entirely.

THE CHAIRMAN: I have always had that very same idea, that extracting the oil from strophanthus with petroleum benzin is preferable to ether; in fact, I am making the two tinctures at present and much prefer the former. I have a number of physicians interested in it, and have been experimenting with it and find it makes a clearer tincture. I found that there was a statement to the effect that tincture of strophanthus should be made with 70 per cent. alcohol, but must not be diluted; so experiments along that line ought to be carried out.

MR. GOOD: I would like to ask Mr. Beringer if he has had any experience with the idea that Mr. Wilbert advanced in making tincture of digitalis—by making it in the ordinary way, and then putting the tincture on ice and filtering it while cold, getting the fat out in that way?

MR. BERINGER: I follow the process very largely of extracting the powder with purified benzin, and then drying it. In addition to that there is a certain amount of ammonia added. We sell a great deal of it, and it is being very highly commented on by physicians.

MR. ———: I can corroborate what Mr. Beringer says, that tinctures made from the same drug, both with the benzin extraction and without the benzin extraction, test up equally well. There is no apparent difference. With regard to making tincture of arnica, it is my understanding from the Pharmacopœia that the process can be altered, provided the same result is obtained. It seems to me it is perfectly proper for you to make the official tincture of arnica by percolation, if you so desire.

MR. ———: I move that the paper be referred in the usual way

THE CHAIRMAN: I think the paper is too important to be treated in the usual way.

MR. LAWALL: I move that it is the sense of this Section that it be accepted, with thanks, and be referred to the Revision Committee.

Carried.

GENERAL SECRETARY CASPARI: The Section has just taken action on this paper of Mr. Cook, and referred it to the Revision Committee. I want to ask if it is the sense of the Section that the paper as presented, which is of course a very voluminous statistical report, shall be published in the Proceedings as it is, or shall it simply be referred to, and the paper itself given to the Revision Committee.

THE CHAIRMAN: The paper itself, as I understand, will be accepted and turned over to the Publication Committee who will have to decide whether or not it is too voluminous to be printed in full in the proceedings; I hope it will not be considered too voluminous for that purpose.

MR. ———: I think it would be unwise for us to instruct the Secretary to print this. The failure to have it printed would in no wise detract from our appreciation of the value of the paper, since it will be practically of no grave importance except to the Committee on Revision; and I think that the printing of a summary of it, such as the Secretary will be able to prepare himself, or obtain from Mr. Cook, would probably serve the purpose. Ordinarily the paper would be referred to the Secretary without instruction, but inasmuch as the Secretary has asked for instructions, I take it we should comply with his request. I am sure the paper in its entirety would not be of much value to a large number of pharmacists as to justify devoting so much space to it in the printed Proceedings. The value of it will be most especially to the Committee on Revision. So, therefore, I move that it be the sense of the Section that the paper be referred to the Committee on Revision, as has already been done, but that we do not deem it essential that it should be printed in full in the Proceedings. I want to make it quite plain that this reference on my part does not mean any lack of appreciation of the work.

MR. BERINGER: I would ask to be allowed to make an amendment to that motion. I think we should request the Committee on Publication to publish at least an abstract of the paper, if not the entire paper.

THE CHAIRMAN: It has been regularly moved and seconded, that the paper be referred to the Publication Committee, and it is our intention to have it published in abstract.

Carried.

THE CHAIRMAN: Now the Nominating Committee is ready.

MR. DUNNING: Inasmuch as Mr. Ladish has expressed a desire that he be not considered for office in this Section, and as Mr. White, unfortunately, is ineligible, because he has retired from the retail drug business, we suggest and nominate Mr. Louis Saalbach, of Pittsburg, for Chairman; Mr. P. H. Utech, of Meadville, Pa., as Secretary; and Mr. W. A. Hall, of Detroit, as Associate.

We do not make any recommendation as to the point I am about to bring out; but we want to call attention to the fact that there are a great many members that are not eligible for nomination for office in this Section, though they are most suitable, because of a by-law which requires them to be actively connected with the retail drug business; and we think this point might be taken into consideration. We observe that nearly half the papers that have been submitted to this Section at this meeting, have been presented by men who are not eligible to office. We simply make that as a suggestion for future consideration by the members.

MR. LADISH: I should like to know if Messrs. Saalbach and Hall know about their being placed in nomination? For this reason: Out in California last year, the com-

mittee went around begging people, and got down the names of men who did not belong to the Association, and then got them all from one little part of the country. Now if you select a man without getting in communication with him beforehand, you may find that he is tied up in some way, and you cannot expect good work from a man of that sort. It would be unfair and entirely uncalled for to place a man in a position where he must do a lot of work, when he has no time to devote to it, and it is an injustice to the man himself. Another thing is about the point Mr. Dunning spoke of. The reason the practical pharmacist is not interested in this is, you frighten him away. You want to encourage these people. You cannot expect a practical pharmacist, who is hampered by the details of his store and the condition of his cash register, to give the same attention to these matters as the man who deals entirely with the other side or phase of his profession. The thing to do is to encourage these people all we can, even if their contributions be ever so little; because as has been pointed out here repeatedly, the salvation of the entire drug business concentrates on the practical pharmacist. And as was pointed out a little while ago, you want these men on the Revision Committee, too. So far as I am concerned it don't make any difference, one way or the other, but you cannot possibly expect to make progress if you are going to keep away the fellows you want. I think it is one of the most important things to be considered to-day, how you are going to get the practical pharmacists interested in this work.

MR. LAWALL: Mr. Chairman, I am not a member of the Nominating Committee, and am not a retail pharmacist, but the nominees of the committee, so far as Chairman and Secretary are concerned, are men with whom I am personally acquainted. Mr. Saalbach, it is true, is a teacher, but his interests are in the retail business in Pittsburg, being a joint owner with his brother. He is a man furthermore who, when he takes up any committee work, does his full duty by the committee with which he is connected, because he has been on committees of which I have been chairman; and I know that he has done good work in his Pennsylvania Association. Mr. Utech is a man who is practicing exclusively, in Meadville, Pa. He has presented several papers at this year's meeting of the Association, and other papers in previous years. He is a constant contributor to pharmacy, and he is another man who always does committee work well when it is entrusted to him.

MR. MAYO: It happens that I am ineligible, under the retail clause, so I can speak from a neutral standpoint. As Mr. Ladish has stated we must get the retail druggist interested if we can, by accentuating the retail drug side, and we ought to do it, and I hope no change will be made in that requirement.

THE CHAIRMAN: I want a correction in that report of the Committee. I will not have any fight with Mr. Dunning, about the teachers, and so forth, predominating, because I wanted the practical pharmacists to predominate, and if you will look over this program you will find that among the 58 papers which were read 29 or 30 were from actual, retail pharmacists. Of course I include Professor Dunning and Professor Hynson, as retail druggists. It is the pharmacist who is very slow in waking up, and a great many pharmacists, as Mr. Ladish says, have not the time to write papers, even though they have the talent, but they can take part in the discussion of them. That is one statement I would like to have corrected, and the program will show I am right.

MR. DUNNING: The reason I brought this matter up is that there are a great many men who have been retail pharmacists for many years and have subsequently become disconnected from it for some reason or another—such as entering into the teaching department of pharmacy, or they may have become connected with some manufacturing concern. That does not mean that they are not familiar with the problems of retail

pharmacy, and that they are not capable of understanding those problems, or that they are not suitable for office in this Section.

MR. LADISH: I don't think there is any use in prolonging the discussion; I think it would be just losing time; I believe the by-laws are all right as they are now, and I would like to move you that this report be received; that the nominations be closed, and that the Secretary be authorized to cast the ballots of this Section for the nominees.

MR. WILBERT: I second that motion.

Motion carried.

THE SECRETARY: I take pleasure in casting the ballot of this Section for the election of Louis Saalbach, of Pittsburg, as Chairman; P. H. Utech, of Meadville, Pa., for Secretary; and W. A. Hall, of Detroit, Mich., as Associate.

MR. WILBERT: I think it is due to the present officers that we give them a vote of thanks. Those of you who were here last evening I am sure appreciate the able work of our Chairman for his most unique symposium on the National Pharmacopoeias. Those of you who were not here I am sure have lost something and will have to wait a long time for anything as good. I move, therefore, that we extend a rising vote of thanks to our outgoing officers for the good work they have done for us.

Motion seconded and carried.

The Section here, upon motion, adjourned, there being no further business before it.

Papers read by title:

EXPERIMENTAL WORK IN PRESSURE PERCOLATION.

BY HILAND FLOWERS, NEW YORK.

In submitting the experimental work by pressure direct,—namely, by pressure upon the menstruum and drug arranged in a cylinder or tube by an air-tight piston, the writer would preface the account of the results herein submitted with a brief outline of general interest. Not that it is to serve as an excuse for shortcomings or as an apology—for the writer does not have in mind that either excuse or apology is needed—the process will either commend or defeat itself.

Since Count Real's attempt at pressure percolation with his column 12 feet in height the attempts at pressure percolation have been many and world-wide. This year, 1910, there have come reports from Turkey and from Germany of results by pressure percolation. The apparatus illustrated herewith was made and used by the writer in 1881 to 1884 in New Orleans for the percolation of ginger. It was demonstrated before the New York Branch of the American Pharmaceutical Association February 7, 1910, published in the American Druggist for February 14, 1910, and noted in the Bulletin of the American Pharmaceutical Association for March 1910. In view of the reawakened interest in the subject the writer deemed it his duty to attempt further experiment, however imperfect, or

under whatever improvised condition, and submit the results to the members of the American Pharmaceutical Association.

Many pharmacists have as many ideas as to the exhaustion of drugs either by percolation or maceration, and no doubt all the processes are good ; hence each new suggestion must take its place, as no hard-and-fast lines could be drawn with any degree of assurance of general acceptance. The process of maceration, old and new school, has its adherents, its champions and its data of accomplishments. To advance the theory that maceration is the process of forces of nature pressing the liquid to point of least resistance, and that pressure applied direct with increased power will accomplish the same results, would open the subject to the scepticism of both schools.

Percolation is atmospheric pressure forcing the liquid to the point of least resistance. Capillarity is nature's process of forcing the liquid to the point of least resistance, upwards, downwards, sideways, or all at one and the same time. The atmospheric pressure is approximately between fourteen and fifteen pounds to each square inch. In the adoption of a method of percolation by pressure direct, the atmospheric pressure is increased or decreased at the will of the operator, and the process of maceration, percolation, capillarity, displacement, lixiviation and filtration is conjointly brought to the point of individual control. In the process of applying pressure direct by piston or compressed air the operation of percolation may be suspended, intermittent or continuous, as the operator may find by experience to be the most advantageous in bringing the drug most effectually under control.

Whether the three samples submitted of experimental work under pressure percolation measure up to the required standard of assay excellence, or not, the results cannot detract from the merit the process may have, for it must be kept in mind that the disadvantages under which these three were produced might offset any deficiency of assay requirements which under more advanced and perfected conditions should produce results which would measure the full assay requirement of excellence. The writer submits what improvised experimental work has accomplished ; the fact that any product can be produced by the process of direct pressure percolation is worthy of attention and interest sufficient to warrant, if not demand, further and exhaustive investigation as to the percolation by pressure direct.

To enter in this paper into any discussion as to the merits of the process seems to the writer needless, for should the process prove effective it would obviously demonstrate its own advantage, it will tend to, if not wholly to standardize tinctures and fluidextracts and give confidence to the physician as to the uniformity of same. Under pressure percolation the process of making tinctures and fluidextracts will be under a definite rule—a given amount of menstruum having a given alcoholic strength and

specific gravity, a given quantity of drug of stated fineness and assay, under pressure direct, whether or not of limited pounds of pressure, should yield a definite quantity of percolate of a given specific gravity and alkaloidal assay.

The tincture of opium submitted with this paper was made by pressure percolation in twenty-five minutes; the sand used was suggested by Mr. Raubenheimer, who said its use in preparing tincture of opium was recommended by the Danish Pharmacopœia. The tincture of strophanthus, submitted with this paper, was made in twenty minutes according to the United States Pharmacopœia as to menstruum and drug. The tincture of nux vomica was made in ten minutes. The United States Pharmacopœia calls for tincture made from solid extract; this was made from the powdered drug. The percolator used was a metal cylinder or tube with an air-tight piston obtained from a six-ounce metal syringe, hand-pressure only being used. The samples submitted were made at the laboratory of Mr. Raubenheimer, 1341 Fulton street, Brooklyn, N. Y., and entered upon his label is a description of each. The drugs were first weighed by Mr. Raubenheimer, then handed to me. The alcoholic menstrea were prepared and measured by Mr. Raubenheimer. The powdered opium and powdered strophanthus were purchased from a wholesale drug house in New York City; the nux vomica was taken from stock.

The formulas for the tinctures are as follows:

Tincture of Opium.

Pulverized opium, 60-mesh fine.....	10 Gm.
Sand	50 Gm.
Alcoholic menstruum, 50 per cent.....	120 Cc.

The powdered opium and sand were mixed in a dry state. A layer of absorbent cotton was packed firmly at the bottom of the cylinder or percolator, 10 Gm. of sand was then placed on top of the cotton and the prepared powdered opium was packed loosely in the tube and one-half of the menstruum was poured onto the drug, the piston inserted and the liquid forced through. The product was a dark percolate; the remaining menstruum was then poured on the drug and forced through, yielding a lighter percolate. The total amount of percolate from 120 Cc. was 95 Cc. Time, twenty-five minutes in the two processes. Estimated pressure, 100 to 150 pounds.

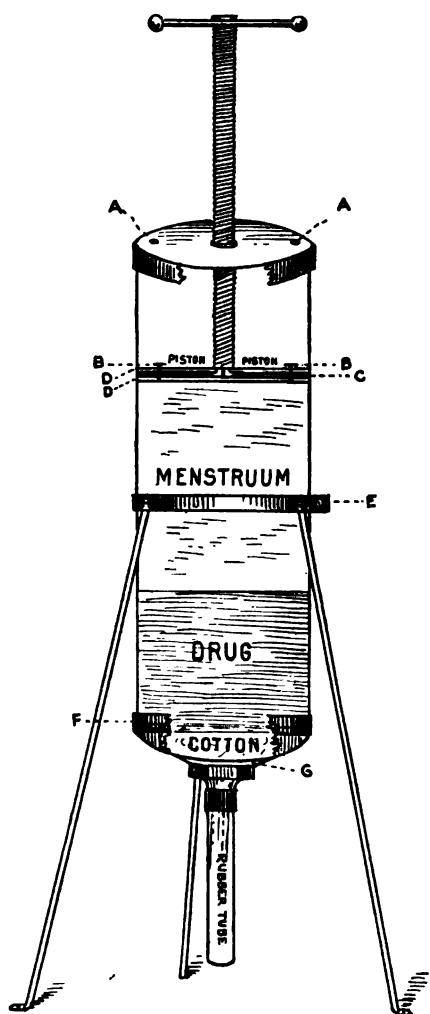
The first attempt to exhaust the opium without sand failed with a small hand machine; the pressure required would reach far beyond any hand power.

Tincture of Strophanthus.

Powdered strophanthus (40 mesh fine).....	10 Gm.
Alcoholic menstruum, 70 per cent	100 Cc.

The absorbent cotton was placed in the bottom of the percolator, the

powdered drug, moistened by a small quantity of menstruum, was packed firmly in the percolator, the menstruum poured upon the drug and the



Flower's Pressure Percolator.

A A, air vent in upper screw cap; *BB*, hollowed thumb screws to permit air to enter below piston; *C*, rubber washer fitted between piston plates; *DD*, upper and lower plates of piston screwed together independent of hollowed thumb screws; *E*, tripod support with screw attached; *F*, lower screw cap; *G*, perfected diaphragm on which cotton rests.

piston inserted and forced through, yielding 90 Cc. of percolate; the pressure was estimated at 75 to 100 pounds. The marc is submitted with sample.

Tincture of nux vomica.

Powdered nux vomica (40 mesh fine).....	10 Gm.
Alcoholic menstruum, 75 per cent.....	100 Cc.

The absorbent cotton was placed in the improvised percolator ; the drug previously moistened was packed firmly and the remaining menstruum poured in, the piston inserted and the liquid pressed through. The process yielded 90 Cc. of percolate. The writer was not satisfied to submit this percolate first obtained, so repacked the drug and again passed the percolate through the drug. Time, about ten minutes at a pressure of about 75 pounds.

The writer is indebted to Mr. Otto Raubenheimer for his kindness in preparing the samples submitted.

The accompanying cut of the pressure percolator, taken from the American Druggist of February 14, 1910, and description of same, are self-explanatory.

The powdered drugs used in the preparation of these samples were 60 or 40 mesh fine. Opium 60 mesh, Strophanthus and Nux Vomica 40 mesh. It is the opinion of the writer that for the preparation of tinctures and fluidextracts more exhaustive results would be secured if the drug were 60, 80 or 100 mesh fine. In the case of tincture of nux vomica where the pressure was 75 pounds, and the tincture of strophanthus, where the pressure was 75 to 100 pounds, a powdered drug 40 mesh fine requiring a pressure of 75 to 100 pounds does not yield as good results as finer powder, even though at higher pressure.

QUALITY OF SOME CRUDE DRUGS EXAMINED DURING 1909.

BY HERMANN ENGELHARDT.

There is no doubt that the Pure Food and Drugs Act has had a decided influence on the quality of the official drugs. While the percentage of drugs which were rejected in this laboratory during 1909 was considerably lower than it was in former years, the following results dealing mostly with the examination of alkaloidal drugs and of some gum resins will indicate that inferior products cannot be altogether eliminated from commerce.

Aconite Root.—No difficulty was experienced in obtaining aconite root of the proper percentage—viz., 0.5 per cent. ether-soluble alkaloids.

Belladonna Root.—Of 36 samples examined during the year we were compelled to reject 14, which came below the required standard of 0.5 per cent. of total mydriatic alkaloids. Some of these samples assayed as low as 0.14 per cent., .19 per cent., .29 per cent., .37 per cent. of total alkaloids.

Belladonna Leaves.—31 samples out of 34 showed an alkaloidal strength higher than required by the U. S. P. Three barely came up to the re-

quirements and as a drug with a higher percentage of alkaloids is obtainable, these three were rejected. In this connection reference should be made to the examination of belladonna cultivated in California, which, however, commanded a considerably higher price than the belladonna on the market. The following results were obtained: Stems, .85 per cent., leaves, .83 per cent., mixtures of stems and leaves .79 per cent. of total alkaloids.

Cinchona.—Of 39 samples examined, 7 had to be rejected, 2 of them assaying as low as 2.9 per cent., and 3.76 per cent. of total alkaloids.

Cinchona, Red—17 samples were examined of which 2 were rejected, not coming up to the alkaloidal strength.

Colchicum Seed.—Considerable difficulty was experienced in obtaining good material. 20 out of 26 samples were inferior to the requirements of the U. S. P., some assaying as low as .24 to .25, .22 per cent. etc. of colchicine. These samples were examined strictly according to the U. S. P. process, which as it was pointed out in various communications from this laboratory gives results which are decidedly too high (40 per cent.). If the new Pharmacopœia should adopt a purification process of the colchicine obtained by the U. S. P. method, the standard for colchicum seed—viz., .45 per cent. of colchicine must be considered as too high and should consequently be reduced.

Colchicum Root.—Only 2 samples out of 13 did not come up to the official strength. As to the purity of the resulting colchicine, the same must be said as mentioned under colchicum seed.

Conium Leaves.—There is no reason for retaining this obsolete drug in the Pharmacopœia, inasmuch as all the samples which were examined in this laboratory had to be rejected, as they contained scarcely any coniine. This is due to the volatile character of the alkaloid and to the fact that the leaves usually arrive in a broken and almost powdered state.

Coca Leaves.—The samples and shipments fully came up to the required strength—viz., .5 per cent. of ether-soluble alkaloids. We received a few large shipments which contained more than 1.25 per cent. of ether-soluble alkaloids.

Ergot.—The quality of the ergot examined during the year was very good. Only 9 out of 34 samples showed a deficiency in chemical and physiological strength.

Henbane.—One out of eleven samples assayed below the required strength.

Ipecac.—This drug has been of decidedly better quality than in previous years. Of 9 samples examined only one assayed slightly below 2 per cent. of total alkaloids.

Jalap.—While in former years it was difficult to obtain a drug with the required 8 per cent. of total resin, a fact which compelled the U. S. P. to reduce the standard for this drug to 7 per cent. of total resin, we have not

encountered any difficulty in obtaining jalap of the required strength. Of 15 samples examined only 4 were inferior in resin. Jalap with more than 12 per cent. of resin was easily obtained during the year.

Jaborandi.—The quality of this drug was excellent. We received samples and shipments with as much as 1 per cent. of total alkaloids.

Kola Nut.—It has been recommended on various occasions to assay this drug, which is not official. The samples examined during the year 1909 were of a very good quality, assaying from 1.5 per cent. to 2 per cent. of caffeine.

Nux Vomica.—While samples with $3\frac{1}{2}$ per cent. of total alkaloids were not infrequent, we received four samples out of 17 which did not come up to the required percentage of strychnine.

Scopola.—The quality of scopola has been very poor during the year 1909. 11 samples out of 15 had to be rejected, assaying less than .5 per cent. of total mydriatic alkaloids. In former years we did not experience any trouble in obtaining scopola root with as high as .7 to .8 per cent. of alkaloids. The low percentage of the drug offered on the market at the present time may be due to an adulteration of scopola root with the root of scopolia japonica which is decidedly lower in alkaloidal strength.

Scammony.—The supply of the exudate and the true root seems to be nearly exhausted, while large quantities of Mexican root are offered on the market. An article dealing with this subject will be read at this meeting.

Stramonium.—There was no necessity for the Pharmacopœia committee to reduce the standard for this drug. Only 2 out of 20 samples assayed below the official standard, while fully 70 per cent. assayed much higher, e. g., .40 to .45 per cent. total alkaloids.

Cudbear.—The coloring power of this drug is not always satisfactory and it would be advisable for the new Pharmacopœia to adopt a method for standardizing it.

Cochineal.—As several reliable methods of determining the coloring power of this drug are available, it cannot be too strongly recommended that the next Pharmacopœia adopt a standard for cochineal in order to exclude the inferior products which are met with on the market.

In conclusion a few words may be said about *Asafetida* and *Guaiac*. 15 out of 28 samples of asafetida had to be rejected, being inferior in content of alcohol-soluble matter and yielding too high a percentage of ash. 4 out of 9 samples of guaiac had to be rejected for the same reasons.

MODIFICATION OF SYRUP OF FERROUS IODIDE.

BY WILLIAM C. TOPLIS, PHILADELPHIA, PA.

The syrup of ferrous iodide, as directed by the U. S. Pharmacopœia, requires the use of iron in the form of bright wire cut in small pieces.

The preparation of the syrup, by this requirement, is delayed unneces-

sarily, thereby exposing the solution of ferrous iodide to prolonged risk of oxidation, in addition to consumption of time devoted to the purpose.

For these reasons, I would recommend the employment of reduced iron instead of bright iron wire cut in pieces.

This recommendation also requires a slight deviation from the handling as directed for the use of iron wire, because the reaction between the iodine and the iron (reduced iron) is so prompt that the heat generated, accumulates more rapidly than it is dissipated. In order to compensate for this condition, the following procedure does well.

Select a flask of ample size. Into the flask, pour all of the water and all of the iodine, lastly small successive portions of the reduced iron, with constant agitation, allowing a short interval between each addition. The heat generated, is promptly dissipated, especially so if the flask used be very large.

The temperature, during the reaction, may thus be perfectly controlled, and the time reduced to a minimum. My observation, on the time required, is eight minutes from start to finish, ready for filtering upon the sugar. The filtrate is beautifully green in color, without a trace of free iodine. This observation was noted on a finished quantity of five hundred cubic centimeters.

Later observations on larger quantities in the hands of my assistant, proved equally successful, yielding a product conforming to the pharmacopœial requirements, to the last detail, and finished ready for use, easily within an hour.

One other difference which may be of some importance is the fact, that reduced iron is a more pure form than the commercial variety, thus avoiding unknown side reactions, that might exert some undesirable influence upon the finished product.

TERPIN HYDRATE—A PERFECT SOLUTION AND SATISFACTORY PREPARATION OF SAME.

FRANK W. A. HAIN, NEWARK, N. J.

The first request for a solution of terpin hydrate to be given in mixtures, etc., came to me about ten years ago, when a physician desired information on the solubility of same.

An emulsion, containing two grains to the fluidrachm, was about the most satisfactory mixture we could obtain at that time. However, it set me experimenting with terpin hydrate, and finally resulted in the following formula :

SOLUTIO TERPIN. HYDRAT. COMPOS.

Terpin hydrate powd.	30	Gm.
Hot glycerin	650	Cc.

Stir until dissolved. When partly cooled add :

Fluidextract wild cherry bark.....	62.5 Cc.
Alcohol	235 Cc.
Glycerin	sufficient to make 1000 Cc.

Dose.—4 Cc. containing 0.12 Gm. (about 2 grs.) terpin hydrate to be taken with water. To meet climatic conditions I found it advisable, however, to reduce the amount of terpin hydrate to 25 Gm. per 1000 Cc., the resulting preparation containing 0.1 Gm. (about 1½ grs.) per 4 Cc. of terpin hydrate in perfect solution.

Codeine or heroin in the usual amounts are readily dissolved in the alcohol before adding to the mixture.

The Pharmacopœia mentions the solubility of terpin hydrate in water (hot and cold), alcohol (hot and cold), ether, chloroform, and glacial acetic acid. Why not add the solubility in glycerin and practical application of same?

ELIXIR OF IRON, QUININE AND STRYCHNINE PHOSPHATES.

ADOLPH F. MARQUIER, NEWARK, N. J.

The formula for my preparation is as follows :

Ferric phosphate soluble	32.0 Gm.
Quinine phosphate	8.5 Gm.
Strychnine phosphate .....	.24 Gm.
Oil sweet orange	2.0 Cc.
Alcohol	250.0 Cc.
Glycerin	300.0 Cc.
Water, a sufficient quantity to make.....	1000.0 Cc.

Directions.—Dissolve the ferric phosphate in 300 Cc. of distilled water; by maceration (cold), the strychnine and quinine phosphates and oil of orange in the alcohol; add to this the glycerin, and lastly the iron solution; allow to stand 24 hours, if possible, and filter.

This preparation will mix with water in all proportions without precipitation, and retains its green color even though exposed to light, the cost of ingredients is no more, if anything less than the present official preparation.

Since its introduction it has met with great approval by the medical profession in our state, having had many requests for its formula.

SOME U. S. P. PREPARATIONS.

BY JOHN K. THUM, PH. G., PHILADELPHIA, PA.

LIQUOR MAGNESII CITRATIS.

The formation of fungi in this preparation after it has been made a short time is a most frequent occurrence. Yet in the directions contained in the Pharmacopœia for the manufacture of this popular preparation the fact that micro-organisms may, or do develop, is entirely ignored. Of

course the Pharmacopœia states that "this solution should be freshly prepared when wanted," but every practicing pharmacist knows that this is impracticable to say the least. It must be kept on hand for immediate dispensing.

Recently boiled and filtered water is recommended by some as a solution of this problem, but this is only a half-measure, or, to be more exact, it only postpones the inevitable result for a few days. To be brief, the question is a bacteriological one, and the answer is absolute and complete sterilization by heat. This point also emphasizes the need and desirability of a chapter devoted to sterilization in the coming revision of the United States Pharmacopœia.

It has been our custom for some time to sterilize our solution of magnesium citrate in the manner described below, and we are firmly convinced that it is the only legitimate and practical way of obtaining a satisfactory preparation from every standpoint. Special or elaborate apparatus is not needed for any work of this kind the pharmacist may want to do in his laboratory or behind his prescription counter.

Ordinary citrate bottles with washer stoppers are used. They are thoroughly cleaned, inside and out, filled completely with water, placed in a deep agate kettle and the stoppers allowed to hang at the sides of the bottles so as to insure their being immersed in the boiling water; the kettle is then covered and boiling carried on for 30 minutes. (We have observed that boiling for 15 minutes is ample when every attention is paid to detail.) At the end of that time the bottles should be emptied and immediately stoppered. In the meantime the solution is prepared and filtered; each bottle is then filled, allowing, of course, enough space for expansion of the solution due to heat. The bottles are now replaced in the kettle and it is filled with water, taking care not to have the water come too near the mouth of the bottles; if this precaution is not taken the water will, in the process of ebullition, dilute the solution. Boiling is then carried on for 30 minutes, the bottles immediately stoppered, labeled, and stored away until needed for dispensing when the requisite amount of potassium bicarbonate is added.

SYRUPUS FERRI IODIDI.

The addition of dilute hypophosphorous acid as a preservative to this preparation as recommended by the Pharmacopœia is not only objectionable but unnecessary. Objectionable because it preserves it too well; the instability of ferrous iodide is what makes it of value as a therapeutic agent. The physician is certain of its decomposition in the human body and the consequent absorption and assimilation of the resulting iodine by the patient.

A preservative, if it does not prevent this decomposition, at least retards it very materially. An uncorked bottle of the U. S. P. syrup of the iodide

of iron exposed to the usual temperature of the laboratory for the last six months shows no signs of the presence of free iodine ; this is significant to say the least.

It seems to the writer that the use of the preservatives in medicines as well as in foods should not be encouraged by pharmacists.

We have been able to make a very fine syrup of iodide of iron which keeps very well and does not liberate any free iodine by the simple expedient of doubling the amount of iron wire.

The working formula is as follows :

Iron, in the form of fine bright wire cut in small pieces	25.0
Iodine	41.5
Syrup.....	
Distilled water, of each, a sufficient quantity to make.....	1000 Gms.

Introduce the iron into a flask of thin glass having a capacity of 500 Cc. and wash well with water several times, then add to it 150 Cc. of distilled water, and afterwards the iodine. Shake the mixture occasionally and when the solution has acquired a greenish color and is free from the odor of iodine boil it for five minutes. Then filter it through a folded filter paper placed in a funnel, the point of which dips below the surface of 700 grams of syrup contained in a tared vessel. When the liquid has run through, wash the flask and filter with a mixture of 25 Cc. each of the syrup and distilled water previously heated to the boiling point, then remove the funnel and add sufficient syrup to make the product weigh one thousand grams. Keep the syrup in small, well-stoppered bottles.

GRAY'S GLYCERIN TONIC COMPOUND; ORIGINAL FORMULA.

P. HENRY UTECH, PH. G., MEADVILLE, PA.

On account of the wide publicity attained by the preparation bearing the above title, and in view of the fact that many different formulæ have been suggested, from time to time, as being identical with the original recipe, I take pleasure in presenting herewith the authentic formula of said Gray's Glycerin Tonic Compound as prepared for, and prescribed by the late Dr. John P. Gray of Utica, New York.

This formula was originated in 1880 by Mr. Charles F. Hurlburt, a pharmacist of Utica (now deceased) at the request of Dr. Gray, who was at that time Superintendent of the New York State Hospital in that city. Having had frequent occasion to use a good stimulating stomachic tonic in his official practice, he instructed the said Mr. Hurlburt to prepare a palatable compound, containing such drugs as might be suitable for the purpose, enumerating such as he thought might be advantageous. As per his instructions the following preparation and modus operandi was devised :

First prepare the following :

Concentrated Tincture.

Gentian root.....	3 ozs.
Taraxacum root.	
Bitter orange peel	āā 4 ozs.
Caraway seed.	
Coriander seed.....	āā 4 dr.
Cochineal	3 dr.
(All in No. 40 powder).	
Diluted alcohol, sufficient to make.....	2 pints.

Mix and percolate in the usual way to make 2 pints of tincture.

Next prepare as follows the

Elixir of Gentian, Taraxacum, and Phosphoric Acid.

Concentrated tincture.....	16 ozs.
Alcohol.....	20 ozs.
Water	48 ozs.
Simple syrup	44 ozs.
Phosphoric acid, 50 per cent.....	3 ozs.

Mix alcohol, water, and tincture together; then add syrup, previously mixed with the phosphoric acid, and filter.

Finally, to make the finished product.

Elixir of gentian, taraxacum and phosphoric acid.	
Glycerin.	
Sherry Wine	of each 8 pints.

Mix. Allow to stand 48 hours. Then filter.

SPIRITUS ÆTHERIS NITROSI.

BY EWING R. COCKE AND C. A. DUNCAN.

Sweet spirit of nitre is defined by the U. S. P. as an alcoholic solution of ethyl nitrite yielding, when freshly prepared and tested, not less than 4 per cent. of the ethyl nitrite. It is evident from this definition that this preparation is not permanent and that only when freshly prepared will it come up to the U. S. P. requirements.

Several samples bought on the open market were assayed and were found to vary in strength from 2.26 per cent. to 3.45 per cent. They were acid to litmus paper and effervesced on addition of crystals of potassium bicarbonate.

When freshly prepared, this preparation is slightly acid in reaction. This can be prevented to a considerable extent by the addition of 5 per cent. glycerin. A sample made in this manner stood for three weeks before showing trace of acidity. Exposure to light for a longer period developed further acidity but apparently not to the extent of U. S. P. preparation. The U. S. P. process directs that the ethyl nitrite, formed

by the reaction between sodium nitrite, alcohol and sulphuric acid, should be decanted into a separatory funnel and the water separated and discarded, then to be washed with cold water in which sodium carbonate is dissolved, this separated and then agitated with dried potassium carbonate.

We find that these two steps can be combined. The sodium carbonate which is to neutralize the acid and the dried potassium carbonate which is to remove the last traces of water will do this if the sodium carbonate and potassium carbonate are added at once and directly to the ethyl nitrite. Thus saving a washing and separating of ethyl nitrite and attendant loss by evaporation, etc. The ethyl nitrite is first carefully separated from the water, the sodium and potassium carbonate added, agitated for a few minutes and separated by filtering through cotton into a tared flask as directed in U. S. P. process. This method saves time, loss by evaporation and ethyl nitrite that is soluble in water used in washing.

SYSTEMATIC OBSERVATIONS ON PEPSIN AND PEPSIN PREPARATIONS.

BY C. F. NIXON.

Various questions have arisen in late years relative to the digestive value of pepsin, and especially of the pepsin preparations. Ten years ago these doubts did not exist to any extent, but as time went on the physician who hoped for digestive action, confined himself to Pure Pepsin or possibly the Essence of Pepsin. The other preparations, whether National Formulary or proprietary, were used chiefly as vehicles or placebos.

Three years ago it occurred to the writer to investigate the subject, and to answer these questions so far as they may be answered by laboratory methods. The assays were made by the U. S. P. process. Four of the pure pepsins of the market were assayed, and all were found to conform to the pharmacopœial standard.

Of the National Formulary preparations, the Essence, Elixir, Elixir of Pepsin and Bismuth, Compound Digestive Elixir, Liquor and Glycerite were assayed at intervals. When freshly made all were found to possess full proteolytic activity except Elixir of Pepsin and Bismuth. This left a residue of 5 Gm. of undigested albumin. Compound Digestive Elixir was found to possess no amylolytic activity. It may be said, however, that the amount of Pancreatin and Diastase in the formula is so small that none could be expected. Further assays showed that the alcoholic preparations lost about 10 per cent. of proteolytic activity in three weeks, about 20 per cent. in five weeks and were practically inert in one year. The Glycerite possessed full activity at the end of one year, and lost about 15 per cent. in three years.

Many of the proprietary preparations of pepsin, essences, elixirs, compound elixirs, powders and tablets were assayed, and their activity ranged from zero to 50 per cent., as compared with similar N. F. preparations. These proprietaries were taken from stock and were of unknown age.

A later question has arisen relative to the utility of rennin in essence of pepsin, N. F. It has been suggested also that the rennin is digested by the pepsin. It is presumably directed in the formula for its milk-curdling properties.

By a series of experiments it was found that .5 Cc. of essence of pepsin, N. F., would produce a firm junket with 250 Cc. of fresh milk at 38° C., in 15 minutes. At the end of 30 days it possessed its full milk-curdling properties, so that it cannot be said that the rennin is digested by the pepsin. A lot of essence of pepsin was made without rennin, and it was found that 4 Cc. would form a junket, under the conditions given above, with 250 Cc. of milk. It was further found that the proteolytic activity of the essence containing rennin exceeded that not containing rennin by only about 10 per cent. The writer would recommend that rennin be eliminated from the formula, as it adds but little proteolytic activity, and is unnecessary as a milk-curdling agent.

While essence of pepsin, N. F., is a most excellent preparation from a clinical standpoint, it is most unsatisfactory as a pharmaceutical product. The alcoholic content is not sufficient to keep it from souring, and the writer very soon found it necessary to increase the amount of alcohol in the formula from 50 Cc. to 120 Cc. This makes a product containing about 18 per cent. alcohol. This is the least amount used in any of the proprietary essences. In all of the assays stated above, the essence contained this added amount of alcohol.

A great source of complaint with the N. F. formula has been the difficulty of obtaining a bright, clear product. It filters very slowly, usually requires several filtrations, and for some reason, frequently again becomes cloudy. These difficulties are due partly to the presence of rennin, and and partly to the use of lactic acid instead of hydrochloric acid. By the use of the corresponding amount of glycerite of pepsin, instead of pure pepsin, these difficulties are also very much lessened. An essence made on these lines was assayed, and found to possess the same proteolytic and milk-curdling properties as that made with lactic acid and pure pepsin. Moreover, hydrochloric acid is a normal constituent of the stomach, and is in many cases a valuable aid to digestion. If rennin is obtained in the formula, the name should be changed to compound essence of pepsin, which would be undesirable.

I would recommend the following formula for essence of pepsin. It is quickly made, with one filtration, remains bright and clear, and does not differ materially in taste or appearance from the present essence.

Take of

Glycerite of pepsin, N. F.	265. Cc.
White wine, (dry Catawba) ..	365. "
Syrup, U. S. P.	65. "
Tincture of sweet orange peel, U. S. P.	10. "
Purified talc.	20. "
Water, q. s. to make.	1000. "

Mix. Dilute the alcohol with 175 Cc. of water, add the glycerite, wine, and syrup. Rub the tincture with the purified talc, add the mixture of fluids gradually and filter. If necessary add enough water through the filter to make 1000. Cc.

Glycerite of pepsin, N. F. is an excellent preparation both for making of elixirs and essences, and for use in prescription compounds. It is, however, unfortunately often prescribed with strong alcoholic tinctures, with too large amounts of hydrochloric acid and with alkalies, chiefly sodium bicarbonate. With all of these the digestive activity of the pepsin is certainly inhibited, and probably destroyed. By the assay process, I have found that no digestion takes place after 24 hours, in mixtures containing 40 per cent. of alcohol, 2 per cent. of hydrochloric acid, or 3 per cent. of sodium bicarbonate.

It is the writer's belief that when pepsin will digest 3000 times its weight of hard-boiled egg albumin in a test tube, it must be of digestive value in the stomach; and that unsatisfactory clinical results have been due to the use of alcoholic preparations of unknown age, and to incompatible mixtures.

EXPERIMENTS WITH ELIXIR DIGESTIVUM COMP. N. F.

BY HENRY C. BLAIR, PHILADELPHIA, PA.

Elixir digestivum compositum has been criticized adversely by so many men of reputation in scientific circles that a practical pharmacist hesitates to express an opinion. In fact he has been led to believe that this preparation is almost useless and a monstrosity pharmacapeutically and therapeutically and that it should be left out of our books of standards.

Everyone criticises the variation in color which can easily be remedied by macerating cudbear in the elixir instead of using the tincture.

Pharmacists tell us that the majority of physicians in this country use elixir digestivum compositum or some similar preparation of mixed enzymes extensively; and physicians say that the results they get by using these preparations warrant them in continuing to prescribe them.

Believing these to be the facts and that there must be some digestive properties in this elixir even when it is old and even though scientists advise otherwise, the writer decided to make a few tests the results of which are here given.

Three samples of elixir digestivum compositum and a check solution of pepsin $\frac{1}{1000}$ were used.

The first sample was made June 18, 1908.

The second sample was made September 1, 1909.

The third sample was made January 9, 1910.

The check solution was made April 20, 1910, or on the day the tests were made.

The Pharmacopœial test for pepsin was used-sufficient elixir to represent one-thirtieth of a decigramme of pepsin added to one gramme of

coagulated egg albumen at a temperature of 125° F. for two and a half hours. Every sample came up to the requirements of the U. S. Pharmacopœia, showing no signs of deterioration or loss of power to digest albumen.

Samples of these same elixirs were tried on fresh cow's milk for coagulating properties.

Fifteen drops of elixir added to four ounces of milk at 100° F. coagulated the milk in fifteen minutes. The pancreatin-check solution took twenty minutes.

On account of the alcohol, acids, and large amount of liquid the starch test was not attempted, nor were tests for diastase made.

As these elixirs were from three months to two years old and still retain their pepsin activity we believe the pepsin ingredient is as it should be.

The pancreatin tests were not carried out fully enough to make a positive statement regarding the activity of the pancreatin, but we believe it is active. Perhaps the diastase is entirely destroyed but some one having the ability and time should determine this as nothing in a theoretic line will satisfy the writer after making the above practical tests.

Physicians will continue to prescribe mixed enzyme liquid preparations especially if they are palatable and pharmacists will continue to dispense them.

If Elixir Digestivum Compositum is left out of our books of standards there will be a great variation in the color and strength of ingredients, and much injury will be done both to ethical medicine and pharmacy.

The writer has samples of various enzyme preparations from one to five years old with and without the addition of potassium iodide.

If there has been any change in the digestive properties of any of these it is only very slightly noticeable although there is a precipitate in every preparation with potassium iodide.

Every pharmacist knows that iodides and bromides are frequently prescribed with enzyme preparations, but it is seldom they see these solutions after making them up as they are nearly always dispensed immediately, otherwise he would notice a change in color in all of them with a precipitate, both occurring after twenty-four hours.

The colored elixirs become very much darker. The precipitate is probably inert albuminous matter.

PHARMACEUTICAL NOTES.

BY CHAS. H. WARE, BALTIMORE, MD.

I hope your section will discuss the following: I suppose every one has had trouble with the N. F. formula for *Essence of Pepsin*; after standing several months, it turns sour and ferments enough to almost blow a cork out of the dispensing bottle. I find the following more satisfactory:

Pepsin (1 to 6000).....	11.25 Gms.
Rennin	16.5 "
Lactic Acid.....	2.0 Cc.
Spt. Orange.....	10.0 "
Glycerin	125.0 "
Alcohol	50.0 "
Syrup	65.0 "
Sherry Wine	365.0 "
Purif. Talcum.....	15. gms.
Water enough to make	1000.0 Cc.

There is some talk of leaving *Ammoniated Glycyrrhizin* out of the U. S. P. Is there any good reason why this preparation should not be used as a substitute for other preparations of licorice? I should like to have it discussed. It seems to me it ought to become popular. I have used it in place of Purified Ext. Licorice, in the following: see page 975 National Standard Dispensatory—*Mist. Glycyrr. Comp.*

Paregoric.....	1111 f. ozs.
Wine of Antimony.....	11 "
Spt. of Nitrous Ether.....	1 "

Mix and add

Ammoniated Glycyrrhizin	46 grains.
Water.....	10 f. ozs.

Filter into a bottle containing, Mucilage, f. ozs. 111, and Sugar, av. ozs. 20.

I have not used it in Co. Licorice Powder, but I have no doubt it will taste better than wood licorice, especially if more sugar is added to make up for the bulky lignine.

Elixir Iron, Quinine and Strych. Phosphates U. S. P., has been criticised, because of precipitation. I have had some trouble with it when the various solutions are added hastily. I suggest that the alcoholic solution of the alkaloids be added to the phosphoric acid and aromatic elixir, and this mixture stand for twelve hours, before adding Sol. Acetate Ammon.

After using *Valeric Acid Salts* in small drug stores, is there any way of neutralizing the odor which hangs around the place much to the annoyance of our customers? I have found that open vessels of strong ammonia water set around the store about ten minutes before weighing out such salts as Quin. Valer., Zinc Valer. and Iron Valer., will neutralize the odor in two hours, but Valer. Ammon. will not deodorize, and so my Elixir Valerate Ammonia is made in the back yard, and my next-door neighbor thinks the odor permeates from the store through two brick walls, and a 4 foot alley, into her house; which recalls to mind a drummer in my store, full of whiskey, so that the odor lingered a long time: a young lady hap-

pened in and telephoned a young man a couple of miles away, after she hung up the receiver she confided in me that that young man must have been drinking because she could smell his breath through the telephone as he talked to her.

LIQUOR SODII PHOSPHATIS COMPOSITUS.

BY W. H. GLOVER, PH. G., LAWRENCE, MASS.

This convenient and useful preparation caused the writer no end of trouble when he first introduced it to physicians by crystallizing in the bottle. At first it was tried in mixture with tinctures but does not mix well, although liquids of low alcoholic strength mix nicely. As glycerin is an old but good friend in pharmacy, it was tried in this preparation with good results and makes a preparation that is quite permanent. The following is the method I use :

Sodium phosphate	1000 Gm.
Sodium Nitrate.....	40 Gm.
Citric acid.....	130 Gm.
Glycerin q. s.	1000 Cc.

Put solids in flask on water-bath till solution is formed, cool, add glycerin and filter. I think if more druggists would make this preparation and show it to their physicians and explain its advantages over similar preparations they will be more than pleased with results.

RANDOM NOTES.

BY J. D. A. HARTZ & THOS. D. MCELHENIE.

These jottings are offered by this self-appointed committee of two as a result of a little journey in Pharmacy in the hope that some items may interest the Committee on Revision.

Syr. Hypophos. Co. U. S. P.—When this syrup is kept for some weeks on the shelf at the ordinary temperature of the store a flocculent formation appears just under the surface. This will not occur if a weak solution of phenol $\frac{1}{10}$ of 1 per cent. is used instead of water for making the solution of alkaline hypophosphites. The taste is not perceptible and there is no possible objection, therapeutically, to the employment of 0.45 Cc. (about 7 minims) in 1000 Cc. of the syrup.

Elixir Aromaticum.—There is no real need for so much as 25 per cent. of alcohol in this preparation. Four some weeks past I have used the formula of Mr. R. R. Johnston of Bucyrus, Ohio, published in the Pharm. Era May 20 1909 p. 469, which contains $6\frac{1}{4}$ per cent. of alcohol and answers every purpose of a simple elixir that I can think of quite as well as the present official elixir and for many prescriptions it will prove an advantage especially when intended for children.

Tincture of Iodine.—The addition of potassium iodide to this tincture is

chiefly to promote the solution of the iodine and render the solution more stable.

We propose that use be made of the fact that the solvent action of the iodide is increased in a dense solution. Also it is a fact that a small addition of glycerin obviates the tendency of the skin to become harsh and dry and sometimes to crack if the tincture is applied several times on the same spot. We therefore suggest to proceed as follows :

Into a 1000 Cc. bottle put 200 Cc. of alcohol and drop in the 70 Gm. of iodine and 50 Gm. of potassium iodide. Shake occasionally during several hours until dissolved. Add 50 Cc. of glycerin and alcohol q. s. to make 1000 Cc.

Compound Tincture of Green Soap.—In making *Tinctura Saponis Viridis* Co. N. F., diluted alcohol should be used to prevent crystallization of stearates. We believe that the Committee on Revision may well consider the economic side of the question of lessening the proportion of alcohol in many galenicals, such as tincture of iron, tincture of iodine, *tinctura saponis viridis* co., etc. The aggregate in 40,000 drug stores would be well worth saving.

Calx Iodinata.—In some quarters there is quite a call for this mechanical mixture of iodine and calcium hydroxide. No mention of it appears in the usual books of reference. We offer the following :

Iodine, 70 parts.

Slaked lime, dry, 930 parts.

Triturate well and keep in a sealed bottle.

Compound Mixture of Glycyrrhiza.—The addition of 5 Cc. ammonia water to 1000 Cc. mist. glycyrrh co. will tend to fix the glycyrrhizin and neutralize any free acid in the mucilage and reduce the volume of sediment.

Ointment of Phenol.—We recommend a return to the formula for 1890 for ung. phenolis as to the base as there is less likelihood of finding uncombined drops of liquified phenol in the ointment made with yellow wax and benzoated lard than in the petrolatum. Many dispensers will continue to make this from the liquified—95 per cent. acid instead of the melted but undiluted crystals. To promote the latter and only correct practice we suggest the warming together in any convenient quantity and vessel of equal weights of pure phenol and benzoated lard and use this in double the quantity instead of pure phenol.

Granulated Sugar.—In some laboratory notes by Mr. Hartz—on page 968 of last Proceedings (1909) occurs a statement as to the superiority of coarse granulated sugar for the uses of pharmacy. This is amply supported by the brilliancy of the syrups in Mr. Hartz's store and the colorless and odorless simple syrup.

We believe it would be quite feasible for the Committee on Revision to insert in the purity rubric under *Saccharum* a clause defining the granules to be such as will remain on a No. 20 sieve. In buying by 100

lb. bag or in barrels one can secure this coarse grade easily at about 10 cents advance per 100 lbs.

Soft Soap.—It is easier to procure cottonseed oil of good quality than linseed oil and no alcohol or heat is necessary to make a soap of the best grade. Whichever oil is used, proceed as follows in any quantity from 1 to 65 kilos. The process can be completed in one hour.

1. Cottonseed oil	76 parts.
2. Potass. hydroxide Greenbank	20 "
3. Water	35 "

To No. 1 contained in an iron cauldron pour in a thin uniform stream a cold solution of No. 2 in No. 3 gently stirring until the last of the solution has been added when a honey-like emulsion will have resulted which if set aside in a slightly warm situation until the next morning will be saponified.

DRUGS AND PREPARATIONS WHICH GO TO MAKE THE PRESCRIPTION.

BY R. H. NEEDHAM, PH. C.

Much has been written and said concerning the increase in use of U. S. P. and N. F. preparations in prescription compounding, particularly during the past two years. The systematic campaign instituted by the druggists as an organization has yielded some results, but not anywhere near expectations. To declare that certain favorable results are obtained, requires little effort for utterance and about the same space of time to be dashed off on paper, but to actually take one's valuable time and slowly and carefully go through prescription files, making tabulations, is altogether a different proposition and furnishes a task that is irksome and rather uninteresting and not at all remunerative. The writer has been considerably interested in reading reports as to progress resulting from the concerted effort made by both physicians and pharmacists to restore the prescription to its status of former years, and he freely confesses, that for some time he was very optimistic as to what was being done. Since getting down to bed-rock facts and figures he has rather concluded that the rosy outlook owed much of its halo to hopeful fancies on his part and that of others and to a lack of acquaintance with hard facts as they really exist to-day.

Lest anyone should get the idea that the information gleaned has been taken from a narrow field, let it be said that the work has been carried on and conducted with a hope and desire that favorable results might obtain, at the same time, all research being carried on with impartiality. That the field is located in the southwest is no great disadvantage, as will be proven. A city of 80,000 inhabitants, a medical center of the state, having both a medical and pharmacy school within her bounds, the physicians prescribing, being graduates of schools from all parts of the union, it would

seem that the prescriptions taken would be fairly representative. Further, let it be stated that no one physician's prescriptions were selected, but the files were perused without any selection as to whom they were written by. It was noted that some very few prescriptions showed the writers were well informed concerning modern *Materia Medica*, while others showed all the ear-marks of having been written by mossbacks, who may have seen better days, but were now in a state of retrogression. As to the style of manuscript and Latin, there were all kinds with here and there a prescription delightful to behold, showing that the writer was alert and thinking, though the majority indicated a very passive state of mind and thought, with a pernicious activity on the part of the writer's hand which rendered the writing typically illegible. First, one thousand selected prescriptions written during 1909 were canvassed with a view of obtaining an idea of what was being prescribed throughout the country. These prescriptions were collected from the files of dispensaries, hospitals and drug-stores located principally east of the Mississippi river, and were written by physicians who ordered U. S. P. drugs and preparations and directed the compounding with skill and understanding.

Not a single patent or proprietary preparation appeared among the number selected, although there were some few New and Non-official Remedies. Second, the prescriptions compared were taken at random from files of those written and filled during the months of January 1909 and 1910. The files of some drug-stores were canvassed for both years, while others were taken but once in order to secure more variety of prescriptions and to avoid camping on the trails of a few certain physicians.

As to the results, let the figures speak for themselves. Of the one thousand selected prescriptions, 57 per cent. were liquids, 34 per cent. were solids, while ointments and suppositories brought up the rear with 9 per cent., of these two, ointments being greatly in the lead. Of the galenicals used in filling these prescriptions, tinctures, fluidextracts and extracts, were compared all the way through. Considering the three classes as a whole, it was found that the percentage for tinctures was 55.5 per cent., extracts 38.5 per cent. and fluidextracts, least of all, 6 per cent. A very few N. F. preparations were ordered.

The second lot of 1909 prescriptions showed solids, 43 per cent., liquids, 54 per cent., ointments and suppositories, 3 per cent.

Tinctures used.....	110
Fluidextracts	34
Extracts	84
N. F. Preparations	89
N. N. R.	172
Patents and proprietaries	343

Counting all N. F. preparations and comparing, exclusive of N. N. R., the percentages read, approximately :

Tinctures	34 per cent.
Fluidextracts	11 "
Extracts	27 "
N. F.	28 "
	<hr/>
	100

Note that New and Non-official remedies total 172 and acetyl-salicylic acid under its usual trade name, occurs 76 times or its percentage compared with other N. N. R. would be 44 per cent. or nearly $\frac{1}{2}$ of this class of drugs was limited to this one article. The 1910 lot of prescriptions shows little change in some respects, in others marked differences will be seen.

Tinctures used	127
Fluidextracts	73
Extracts	68
N. F. preparations.....	85
N. N. R.....	228
Patents and proprietaries.....	291

Repeating the comparison as in case of the 1909 prescriptions, the approximate percentages are :

Tinctures	37 per cent.
Fluidextracts	21 "
Extracts	17 "
N. F.	25 "

Attention is called to the increase in the number of N. N. R. and of this number acetyl-salicylic acid entered into prescriptions 110 times ; about 48 per cent. or $\frac{1}{2}$ of these new remedies prescribed were of this drug.

Let us count gains and losses during the year. 1910 shows the following approximate gains over 1909.

Tinctures	15 per cent.
Fluidextracts	115 "
N. N. R.....	32 "

The losses for 1910 over 1909 were of three classes, all quite important.

Extracts.....	45 per cent.
N. F.	4.5 "
Patents and Proprietaries	18 "

The other ingredients used in the prescriptions consisted largely of organic and inorganic salts following the the usual routine ; if soluble or deliquescent, being ordered dispensed in solutions ; if soluble and more permanent, in papers or capsules. The facts to be demonstrated in this article are, that the preparations upon which so much care and time is spent both by the Pharmacopœia and the theoretical and laboratory teaching of pharmacy,

are sadly neglected by the physicians. While true, that fluidextracts show a handsome gain, observe the meager use during the first year. After looking the data over, one is tempted to inquire what is the actual use or benefit to be gained by the valuable time given to prescribing methods of manufacture, assay processes, etc., when not over ten different tinctures seem to be demanded in the average drugstore and of the fluidextracts ordered not a few are unofficial. The major part of the tinctures, fluidextracts and extracts are to remain on our shelves drawing dust and dirt, but no interest on capital invested.

One very remarkable fact is not shown in this investigation, though the apparent gain in N. N. R. is considerable and the use of acetyl-salicylic acid is rapidly increasing in favor with physicians, yet inquiry brings the reply that the number of prescriptions in which this drug enters is a poor index as to its use by the laity in self-medication. Reports bring the startling information that it is becoming a staple, supplanting acetanilide and other coal-tar products.

The propaganda for reform has an immense amount of work yet to do, for though patents and proprietaries show a decrease in prescriptions, yet the startling figure for the first year is almost three times as great as that of tinctures. Physicians approached on this subject reply that when the Pharmacopœia contains those preparations which give the results they desire, then will they cease to prescribe patents. In other words, shall the U. S. P. become a patent-medicine almanac and all the labor of decades go for naught? The drugs which go into many of these ready-made prescriptions are enumerated in the Pharmacopœia, and no one acquainted with the Pharmacopœia would ever suggest such a backward step. Let the U. S. P. remain a book of standards and simples, the National Formulary and dispensaries will still be able to take care of the other preparations. Too many of the pharmacists are drifting with the tide, being carried with the current, caring little as to what enters into the prescription. While they are sleeping commercial men, not the revisors of the Pharmacopœia nor prescribing physicians, are directing and dictating as to what shall enter into the prescription.

THE PRACTICAL SIDE OF A PROFESSIONAL PHARMACY.

BY J. LEON LASKOFF.

A great deal has been said at pharmaceutical meetings and pharmaceutical periodicals are full of literature concerning the elevation of pharmacy as a profession, all tending to raise the standard of the profession on a par with others. However, all or at least the greater part, has seemed to me to be "problematical" or I may say "speculative" and only because the remedy suggested was of such nature that it would almost be impossible (under these existing conditions) and in very many instances too ideal.

My personal experience in foreign countries and in this country has taught me that there is a *royal road* to the success of the modern Pharmacy as a profession, if members bear in mind some or all the factors, which I have attempted to outline for their consideration and approval. In every civilized country of this world, other than our own progressive America, Pharmacy as a tone profession they make a distinction between the mercantile druggist and the professional pharmacist. This fact I have pointed out before in another article. However, custom has decreed that we to-day are encumbered, because we combine our efforts in the direction of one "goal," namely to make "money," and practicing our art in a "store."

Now, inasmuch as we must do so in order to live up to custom, and incidentally to the expense incurred in conducting our business, this remedy—and I may say it with a marked degree of positiveness—lies in the "*divorcing*" or separating our store from our dispensing department, not merely by putting up a counter partition, or ground-glass partition, but by having an entirely separate and distinct room in which there shall be not only the necessary paraphernalia, such as scales, graduates, mortars, spatulas, etc., but a full line of the necessities in use every day, for compounding drugs, chemicals, tinctures, syrups, etc.

The store should be divided in such a way that the prescription department would occupy the major part and the front of the store should be used only for mercantile purposes, containing the soda fountain, sundries, proprietaries, etc. The prescription department should be an entirely separate feature and by itself, where strict silence and secrecy can be observed. Proper checking-off of the doctor's prescription avoids errors and "complaints" and where we can properly fulfill the extreme responsibility thrust upon us, and safeguard ourselves against erroneous dispensing. Remember that human life is at stake, and accuracy is our salvation. Prescriptions should never be dispensed in such a way that the laity can see it done. If a customer sees you measure off a liquid in a graduate he may feel nervous to think that perhaps you may make an error and give him one drop too much, and poison him, his wife or his children. Employ competent help. They will cost a little more, but are cheaper in the end.

Now, a word as to some of the "stumbling blocks" that we meet in our practice. Now and then a "sticker" shows up in the way of a peculiar mixture, pill, capsule or ointment prescribed by the doctors, which if not properly put up will not be desirable. Either they will be bad-looking, too bulky, not uniform or as in ointments gritty, lumpy, etc.; and yet you have followed the order and used all the correct ingredients. There is a great deal of tact to be used in some of these cases, and we should never consider a little waste of material, if it is necessary for us to bring about a good result, to discard a poorly made prescription and experiment in var-

ious ways to attain the desired result. Neatness in the general appearance of our ointment, capsule or mixture counts for a good deal and all help to build up your general reputation and incidentally your trade. To gain the confidence of the physician, never let it be said by your brother pharmacist that he can make up a certain "prescription" which you have already dispensed and sold better than you.

I could illustrate hundreds of prescriptions which came to my notice, but the following will suffice to show you what is meant by using care and a little trouble, with but very little expense :

(1) Codeine	0.6
Compound Tincture Benzoin.....	30.0
Syrup	90.0
Water	ad 120.00

MDS as directed.

By dispensing this prescription in the way it is written the benzoin will separate and stick to the bottom of the bottle, but by adding one drachm of powdered acacia the mixture will be uniform and elegant in appearance.

(2) Sodium Bromide	4.0
Calcined Magnesia.....	0.8
Validol.....	4.00

M. Div. in capsules No. XII.

To put this up in capsule form, the way it is written, is absolutely impossible, except a mess is made and then the capsules will be of an enormous size, but by adding 10 grains more magnesia it will form a nice dry powder, and you can dispense it in No. 1 dry capsules, which will look white and elegant in appearance.

(3) Ol. Theobrom.....	12.0
Ol. Amygd. dulc.....	15.00
Sulphur Ppt.....	3.0
Resorcin	1.5
Ol. Rosæ.....	gtt. 4

The best way to dispense this prescription is to melt the ol. theobrom. and the almond oil ; then dissolve the resorcin in a few drops of water and rub it up thoroughly with the ppt. sulphur ; then rub the rest of the ingredients on a slab little by little with the melted cacao butter, until it forms a nice smooth, perfect ointment.

(4) Bals. Peru.....	
Ungt. Zinci oxidi aa.....	15.0
Mf. ointment.....	

This prescription looks very simple, but you will be surprised when you

rub the two ingredients together, it will form a gritty hard ointment which is absolutely impossible to apply on any sore. After long experience I found that a few grains of powdered acacia added to the Peru balsam and mixing same with the zinc ointment, the mixture will form a nice smooth soft ointment.

The above-mentioned prescriptions were dispensed in different stores in different ways, but I think after a little experimenting I have succeeded in doing them up in the most satisfactory way. Now, a little code of "Ethics," which it does no harm and always does good to observe.

1. Always show a friendly and professional spirit to all physicians with whom you come in contract.

2. Always treat your competitor fairly and squarely.

3. Never criticise a prescription to the patient.

4. Never discuss the relative merits of the physician in his prescription with your customer even when he asks you to do so.

5. Never make a diagnosis—always leave that to one who knows—the doctor.

6. Never practice substitution.

7. Never practice medicine or surgery.

8. Never practice gossip.

9. Never practice knocking your competitor.

10. Never practice emenegology.

The above may serve us all as the decalogue of pharmacy. To elevate the profession some good rules are worth while mentioning of great importance to the professional pharmacist.

1. Never have any kind of window display other than that which relates to your own profession. Do not specialize with patents or unethical nostrums.

2. Use neat bottles, boxes and labels. Make neat packages.

3. Write labels plainly and distinctly, and in full as per "signature," not abbreviated.

4. Make note of size and weight of masses in pills and capsules on prescriptions, so that repetition will correspond with the original dispensing.

5. Always keep the latest ethical remedies in stock and request the manufacturer to send notice to doctors that you have done so. This is good advertising ; it is strictly ethical, and at the same time scientific.

6. Buy only the best drugs and chemicals from reputable houses. The physicians will obtain the desired result. Any preparation you yourself manufacture should always comply with the standard of U. S. P. and N. F. (N. B., our "Holy Bible.")

Complying with all of the above-mentioned rules, physicians and the public in general will have more confidence in you. This may not all appeal to all of our members, but a little reflection on their part may awaken

them to a realization of the vast importance of this feature. Many I know will say, "What's the use? We have been able to get along so many years in the old way; why change it now?" And now, gentlemen, there lies the danger. The warning note has been sounded; competition with the cut-rate stores is now so keen that we must find a remedy. Let them thrive on cut-rate prices and miscellaneous goods. You cannot do it. Let them spend money on advertising and displays; you cannot do it. Let them have candy and other side-lines; you cannot do it. Let them carry an enormous stock of everything for the household; you cannot do it. But they can't prove themselves truly and honestly professional pharmacists, and what is more, *you can*.

You are in direct contact with the doctors and patients. You are right in their midst. You can show them that you can dispense the prescriptions; you can gain their confidence as to your ability and accuracy; you can show them that you are a pharmacist and not a merchant, pure and simple. They will then bring their prescriptions to you; they will buy what they need from you, and you will incidentally reap the harvest that is due you. That is why you should make a "specialty" of your store; that is why you should practice a "specialty" as is done in other professions. Become a prescription specialist. Make your store look like a professional store, not a dry-goods store, candy shop or patent-medicine cut-rate establishment.

We pharmacists have been awakened from long sleep and must be up and doing. Remember the story of the lion and the mouse. We must endeavor to put a net around the lion and then we can feel safe. We have taken the wrong steps to endeavor to compete with those who are trying to devour us. We imitate their methods. We try to do as they do. Gentleman, we cannot, and if we do, we are signing our own death warrant. We have neither the capital nor the facilities to do it, but we have the brains, the knowledge to elevate ourselves far above the standard of the big stores to-day, by making our only "specialty" (and you know it is a paying one) dispensing; you will sell all other things just as you have heretofore, and if you should sell a few bottles less of some proprietary preparation which are on our shelves and in our closets, you may be able to save a few dollars.

Much more could be said and written upon this very valuable subject, but inasmuch as there is nothing new to which I lay claim, yet a strict observation of what has been written will go a long way in paving the rocky road to a successful issue, to which we are trying to attain. Let the blue laws of our profession be revised. Let us be awake and looking for the future. In fact the future is now very near, and we must be ready to face it—not as merchants but as professional men.

"QUALITY VERSUS QUANTITY OF U. S. P. AND N. F. PREPARATIONS."

BY ABRAHAM WEINSTEIN, N. Y. CITY.

I believe that the usual way of doing our duty to pharmacy by annually presenting papers to the convention so as to help to increase the pages of our U. S. P. and N. F. is out of date, and not in accord with the progress of our present day, because, in my opinion "quantitive pharmacy" has already reached its summit and it is high time now to look down upon the road it has traveled and examine whether it was really for the welfare of humanity and pharmacy to pile up such huge quantity of preparations for public use and pharmaceutical interest.

Not how much but how well should be the golden rule in pharmacy and my earnest hope is that the next revision committee will direct their efforts solely to improve the already too many complicated preparations which crowd the pages of our official books.

It is the spirit and not the letter which moves the world: every formula inserted in our official books should be infused with the spirit—first, how best to serve the sick of our country, second, the welfare of the medical profession, their interest must be kept up in pharmacy as a science and art, and in this day of struggle must agree with the time and patience they can devote to its interest.

Simplicity and improvement should be the scope of the revision committee in the future.

MISTURÆ CONTRA DIARRHŒAM—DIARRHŒA MIXTURES.

These preparations are never or very seldom now prescribed by physicians but too often called for by the public due in many cases to the enormous amount of opium they contain. It is therefore time that they should either be discarded altogether or the opium replaced by some other innocent ingredient. It will certainly not offend the distinguished originators of the formulas if we can thereby save at least one life from the terrible misery of a fiendish habit.

ELIXIR DIGESTIVUM COMPOSITUM.

As a digestive elixir it ought to contain more pancreatin and diastase, and no pepsin at all. Pepsin is not the best digestive ferment we have; pancreatin is richer in ferments containing trypsin, amylopsin, and steapsin. I believe the following improvement should be made:

Pancreatin	20 Gm.
Diastase	10 Gm.
Sodium bicarbonate	20 Gm.
Glycerin	250 Gm.
Water	125 Gm.
Tr. cudbear	15 Gm.
Purified talc	15 Gm.
Aromatic elixir a sufficient quantity to make	1000 Cc.

Introduce the powders in a mortar and rub with water until solution is effected ; add the other ingredients ; incorporate the talcum with the mixture and filter. It is with malice toward none and love of improvement for the benefit of all, that I was animated to offer these suggestions. Let me hope that it will meet with the approval of those whose welfare I seek.

SPIRITUS MENTHÆ PIPERITÆ.

The direction of macerating the oil together with the leaves in alcohol for 24 hours is not practical, for the leaves unnecessarily absorb some of the oil. The better way is to macerate the leaves with the alcohol for 24 hours, filtering and then adding the oil.

TINCTURA IODI.

The popularity of this preparation with the public demands that it should be reduced to $\frac{1}{2}$ the present strength. I am positive that every practising pharmacist will recall more than one case of a burn with the tincture. So frequently are the complaints in my store, that I am compelled to keep the official "Glyceritum Amyli" and carron oil near the iodine tincture. The strength of the British Pharmacopœia which is about $\frac{1}{2}$ the strength of our official tincture and prepared by the same method would prevent such disagreeable occurrences.

ELIXIR PEPSINI.

This preparation ought to be discarded from the N. F. altogether and "Essentia Pepsini," which is the better preparation, be recognized only. There is absolutely no reason why an inferior preparation should be retained when a superior one is introduced. The physician wants the best preparation obtainable and does not care about the name.

UNGUENTUM PHENOLIS.

The present official ointment is a faulty one because the carbolic acid which is not soluble in petrolatum is thrown out of the incorporation in a very short time and the result is either a dangerous one of getting too much carbolic acid or a worthless one containing none of the phenol. The old formula of using ointment should be restored as the carbolic acid is completely soluble in fats and makes a permanent uniform ointment.

EMULSUM OLEI MORRHUÆ.

This preparation has been the cause of much trouble and to some loss of reputation and money. I know personally of many explosions it has caused, due to the presence of sugar in the form of syrup with acacia which is composed chiefly of arabic acid. While sugar is not directly fermentable it is easily converted into dextrose and levulose under the influence of dilute acids or micro-organisms, and is then fermentable. The remedy seems to be to abandon acacia and use a different emulsifying

agent. The chondrus emulsion of the N. F. or a tragacanth emulsion is more stable and satisfactory. The substitution of glycerin will not do in this preparation as glycerin spoils the emulsion by precipitating the acacia.

Quality absolute and pure is the demand of the day; for the light of reason is penetrating our country everywhere in our national "House," Senate, press, and behind the counters of the mortar and pestle men.

The following preparations are a few of the many which can be simplified and improved.

"Elixir Ferri Quininæ et Strychninæ Phosphatum." This preparation seems so complicated and confusing to the ordinary pharmacist that he has been forced to give up manufacturing it for the "ready made specialty." The purpose of this formula is a preparation containing in each teaspoonful $\frac{1}{2}$ grain quinine, $\frac{1}{4}$ grain strychnine, in the form of phosphates, and one grain soluble phosphate of iron, in aromatic elixir, which seems very simple yet a whole page of the U. S. P. is taken up with the ingredients and methods of preparation. The addition of ammonium carbonate, acetic acid, and ammonia water to form ammonium acetate, is not at all necessary for it does not at all prevent the annoying discoloration which is due to the saccharine solution of the elixir in the presence of some free phosphoric and acetic acids. A much better preparation is obtained by simply reducing the wise official preparation "Glyceritum Ferri Quininæ et Strychninæ Phosphatum" to the specified elixir strength, with an aromatic elixir made with glycerin instead of sugar, the stability and color of which is thereby assured or by using the same ingredients and method accordingly as directed in making the glycerite of the I. U. S. P.

CRITICISMS OF THE TINCTURES OF THE UNITED STATES PHARMACOPŒIA.

BY PAUL J. WALDNER, PHARMACIST, U. S. NAVY.

The fact that a paper of this title has been invited gives evidence of a general belief that this class of preparations stands in need of more or less revision. Briefly, the criticisms which apply to the tinctures official in the eighth revision of the Pharmacopœia may be summed up as follows: (a) That a certain number now official should have no place in the Pharmacopœia; (b) that the class embraces several preparations, notably tincture of iodine and camphorated tincture of opium, which are not tinctures in the accepted sense; (c) that there is still much to be desired as regards uniformity in percentage composition; (d) that no standards of potency are established in several important instances; (e) that some provision should be made whereby duplication of tincture and fluidextract may be honorably avoided in cases where the menstruum is the same.

In this paper individual tinctures will not be discussed. Thus considered, the class presents a broad field for pharmaceutical and physiological

experimentation and constitutes a task which no single individual should, or properly can, undertake. Considered entirely as a class, and disregarding specific drugs or their tinctures, this group of pharmaceutical galenicals offers a profitable subject for discussion. This applies with even stronger emphasis to the sister class, the fluidextracts, a class of preparations whose virtues and excuse for existence are debatable when considered in the light of their present limited field of legitimate usefulness, and the sins, therapeutic and pharmaceutical, which they have occasioned. It seems pertinent to interject these remarks in view of the bearing which this class of preparations has on the tinctures as often dispensed, and the too frequent and disreputable intimacy which is often permitted to exist between them. Saving the presence of the manufacturers, fluidextracts may safely be said to constitute one of the big nails in the coffin of ethical pharmacy—although not a few of them have proven good and useful preparations.

Beginning with (a) under the general criticism, we are confronted with the ever-perplexing question as to which preparations should be dropped. With the passing of empirical medicine and the growing movement for a scientific administration of drugs, we find the armamentaria of physicians becoming more and more uniform and relatively restricted. The Pharmacopœia, to serve its best purpose, should as nearly as practicable anticipate future requirements, rather than reflect only the experiences of the past. With this object in mind it will be found that much more or less obsolete material can be justifiably dropped. Recognition of this feature will, however, entail the exercise of a liberal and broadminded discretion on the part of those seasoned practitioners who have a voice in revision. Those tinctures which may be eliminated, need not however be entirely denied recognition. The writer would propose that provision be made in the forthcoming Pharmacopœia whereby the standard of such tinctures as are eliminated may be fixed as that which obtained in the Pharmacopœia in which they were official. This plan could possibly be made to apply similarly to other classes of preparations. The objection which might be advanced against this scheme is that it would entail familiarity with former Pharmacopœias on the part of both physician and pharmacist, but this contention loses force when it is pointed out that the physician who prescribes such preparations is presumably familiar with them, and the hardship on the druggist would be wholesale. In the discussion of the relationship between tinctures and fluidextracts, a list is given of those tinctures which are suggested for elimination.

(b) While tincture of ferric chloride and camphorated tincture of opium are tinctures within the strict definition, they are hardly so in the accepted sense of the word, and the latter particularly must always stand out as a distinct exception in any plan involving a desire to make for uniformity of percentage strength of principal ingredient. Considering iodine and ferric chloride together, they represent the only tinctures which are

solutions of inorganic drugs. If radical changes are to be made in the Pharmacopœias, it might be well to consider the advisability of redistributing these preparations under other classes, or to combine the anomalies of all classes of preparations into a separate class.

(c) Regarding uniformity in percentage strength much has been said and written. A decided forward step in this direction was made in the last revision and those who predicted disastrous consequences as a result of the more radical changes have not been supported by the developments.

It would seem a most propitious time to adopt a rule of one-strength tinctures, now that so much progress has been made toward this end. The idea, advanced by some, of having the tinctures of such strengths that all could be given in a like dose, is not based on sound clinical experience. This plan would give rise to tinctures of widely varying strengths, and the variations in potency represented by the different drugs would involve either extreme concentration in certain instances, if a small dose were fixed upon, or, on the other hand, such dilution in other cases as would forbid the use of given tinctures in disease conditions where alcohol is distinctly contra-indicated. Moreover, intelligent dose adjustment to the individual case presupposes a clear understanding of the quantity of drug represented, which would be no difficult matter if all were of one strength, but would be even more perplexing than it is now if the plan outlined were in effect.

(d) Standardization.

The work of Sharp, Rippetoe, Hamilton, Houghton and others with certain drugs, such as squill, strophanthus, digitalis and ergot, shows that these drugs need no longer be administered haphazardly and that standards of potency, deducted from experiments which have brought results which could be accurately recorded, may reasonably be expected. The contention that such processes, in distinction from the assays, cannot be carried out by the dispensing pharmacist should have no weight in deciding the question. Reliance, on the part of physicians, on the physiological action of these drugs is so amply justified by clinical experience, that the therapeutic activity of their preparations should not be left to chance or the good intentions of the pharmacist.

(e) The relation of tinctures to fluidextracts, and list of tinctures suggested for elimination. No law is so useless as that which is extremely onerous or difficult of enforcement, and that ethical, unwritten law which forbids the dilution of fluidextracts for the preparation of a tincture is a striking example. Knowing, as we all must, that the rarely used, as well as some very popular tinctures, are in many instances made by dilution of a fluidextract, it might be just as well to recognize the hard fact and, wherever it can properly and consistently be done, legalize a method whereby dilutions—either of fluidextracts or, possibly, of such fluidglycerates as have been proposed by Beringer—may be dispensed as tinctures.

This plan would make the proceeding proper in the cases for which it is prescribed and, by inference, wrong in every other instance. The list below embraces those tinctures which have a corresponding fluidextract made with a menstruum like that prescribed for the same tincture, or with but a negligible difference. *Digitalis* has purposely been omitted because it is believed that this preparation should be physiologically standardized. *Lobelia*, *sanguinaria* and *squill* have also been omitted for the reason that the fluidextracts of these drugs are acetic acid extractions while, with the exception of *sanguinaria*, the tinctures are made with an entirely hydro-alcoholic menstruum.

List of tinctures which have corresponding fluidextracts made with practically similar menstrua; those in italics are recommended for elimination and for those in plain type a dilution of the fluidextract is proposed as the official tincture:

Aconite,	<i>Hyoscyamus</i> ,
<i>Bitter orange peel</i> ,	<i>Krameria</i> ,
Capsicum,	<i>Quassia</i> ,
<i>Cimicifuga</i> ,	<i>Quillaja</i> ,
Colchicum seed,	<i>Serpentaria</i> ,
<i>Cinchona</i> ,	<i>Stramonium</i> ,
<i>Indian cannabis</i> ,	<i>Valerian</i> ,
<i>Calumba</i> ,	<i>Veratrum</i> ,
Gelsemium,	Ginger.
<i>Hydrastis</i> ,	

List of tinctures recommended for elimination; those in italics are included in the above list and their drugs have now an official fluidextract:

Aloes,	<i>Hydrastis</i> ,
Aloes and Myrrh,	<i>Pyrethrum</i> ,
Arnica,	<i>Quassia</i> ,
<i>Bitter orange peel</i> ,	<i>Quillaja</i> ,
Calendu'a,	<i>Serpentaria</i> ,
<i>Cinchona</i> ,	<i>Stramonium</i> ,
<i>Indian cannabis</i> ,	Tolu,
<i>Calumba</i> ,	<i>Valerian</i> .
Cinnamon,	

It is proposed that for such tinctures as are eliminated, the standard be established which was prescribed by the Pharmacopœia in which they were official. The modifications herein proposed would obviously necessitate some readjustments in other directions in conformity with the changes affected, but these are minor details not difficult of solution.

In conclusion, it should be borne in mind that at the present time one of the cardinal aims should be the development of confidence in, respect for, and particularly employment of, the *official* preparations on the part of physicians. The use of tinctures is dependent upon the physician's familiarity

with them. Simplification, wherever practicable, should be the keynote, so that the medical fraternity will look to the Pharmacopœia rather than to the "hand-me-downs" of the manufacturer. Furthermore it should be remembered that these preparations are, or should be, largely made and must be kept on hand by the retail pharmacist whose time and material must be economically expended to meet the active competition of the day.

THE DISPENSER.

J. WINCHELL FORBES, ROSSMOYNE, O.

I have a very large correspondence, and I often get letters which set me to thinking, but I haven't received one in a dog's age, which made me pull my thinking-cap as far down as one from Otto Raubenheimer, chairman of the Committee on Practical Pharmacy and Dispensing.

Raubenheimer says: "As one of the few who are able, and who are willing to criticise the U. S. P. and National Formulary, I hope you will contribute a paper to my Section."

So far as the willingness is concerned, he may be right, but as regards the ability, it strikes me that it must be pretty poor specimen of a dispensing pharmacist who is not competent to form some kind of an opinion as to the merits or defects of his standard text-books, especially under present conditions.

My active work behind the dispensing counter ceased in 1874, that is, more than thirty years ago, and since that time, there have been wonderful changes in both the business of pharmacy and its status as a profession. In those days, the Pharmacopœia, although nominally the text-book of the "back room," was in reality a work which was of infrequent presence in the drug store, while the National Formulary was in a tentative stage, as a collection of formulas which "those Brooklyn fellows" had found to be satisfactory in their neighborhood. The United States Dispensatory *was* the pharmacopœia. It was not looked upon as a commentary, but as the real fountain-head of all pharmaceutical wisdom and knowledge. "It isn't in the Dispensatory," settled it. If some fool doctor asked a pharmacist if he had a copy of the U. S. Pharmacopœia, he was handed the Dispensatory, and that might be the U. S. or the Standard, for very few had a copy of both.

Of course, I refer to condition, on the Pacific Coasts; but I am of the opinion that it was about the same in "The States," for our experience with late arrivals from the other side of the Rockies, was that the demands were lighter on pharmacists in their home cities than with us. The reason is not far to seek. Owing to the unusually cosmopolitan character of our population, we were compelled to supplement our U. S. and Standard Dispensatories with the French Codex, Dorvault's L'Officine, and the Pharmacopœia Borussica, the British, Edinburgh, and Dublin dispensa-

tories being taken care of by the United States Dispensary. This was peculiarly the case as regards San Francisco, but as prescriptions often wandered off into the country sections, where the extra works were unknown, Wakelee, Thayer, Lefevre and Rotourier, in San Francisco received many prescriptions for filling, from the benighted sections.

Even Sacramento, the next largest place to San Francisco, was one of those sections as Jim Doherty's was the only place in the city where prescriptions not founded in the dispensaries stood the least chance of being understood and correctly filled. I was with Doherty for four years, and I know that at that time he had the only copy of the U. S. Pharmacopœia in town, besides my own private one.

There might have been other pharmaceutical journals published in this country, but at that time (during the early sixties) the only one that I knew of, was the American Journal of Pharmacy. Doherty was a subscriber for this, and also for the British Pharmaceutical Journal, and these two kept us pretty well posted as to what was going on in professional pharmacy. The era of so-called commercial pharmacy had not yet begun, and that of cut prices for drugs and proprietaries was yet in the womb of the Future.

As I contemplate the conditions of to-day, I may well pull my thinking cap well down over my ears, before beginning a paper dealing with dispensing pharmacy, especially with regard to a work which deals largely with a lost art for the average retail druggist who buys his galenicals ready-made, and as I have known to be the case, even to peppermint water, lime water, etc., and who rolls his pills out of a bottle, instead of on a pill machine.

The only man who is able to write such a paper is manifestly the "man behind the gun," the one who wrestles with modern conditions. The men behind the guns have of their own accord surrendered the professional part of the business to others; hence they have surrendered the Pharmacopœia with it, and to those others must fall all criticism or commendation of that work. As regards the counter manipulation of the very present, it seems to be reduced to the preparation of extemporaneous prescriptions, and with the advent of the modern synthetics, and their extensive use by the doctors, it would appear that in this direction, dispensing practice is reduced to determining incompatibilities which cannot be predicted from chemical considerations, but which we only find when we run up against them in actual practice, and here again we find that we must depend upon the men behind the guns.

However, experience has taught me that Experience is not a thing of the future, but one of the past, and thirty-odd years of active work behind the dispensing counter has shown me that even with our present army of journals, and their contributors, knowledge is slowly assimilated by pharmacists, and that even the best of us habitually pass by many things of

value. Every day it comes home to me what opportunities many are passing by by not allying themselves with the American Pharmaceutical Association and their local societies, and subscribing to pharmaceutical journals, the more the better.

There has been much agitation in regard to the principle of cooperation as a means of bettering the present condition of the pharmacist. One of our local papers, only a short time ago, had an editorial calling attention to the fact that no cooperative plan had ever succeeded which was not founded upon some form of religion. The nominal basis of the most successful organization of pharmacists, the N. A. R. D. was the religion of "Live and let live;" its efforts are now largely founded upon another, "honest goods and honest service," and to be sure of the honest service, the educational bodies are insisting upon a high mental status and better education for those who are to take the places of the present generation of pharmacists.

This is what the dispenser of to-day is facing, and it behooves him to add continually to his knowledge, in every possible way, or when he comes to the time of the sere and yellow leaf, he will find that young blood has displaced him at the counter, for he will not have the experience and knowledge to offset the youth of his competitor.

Now this is more of a paper on the dispenser than one on dispensing, but let those who are beginning the race, heed the words of one who has been, and is a careful student of the conditions of pharmacy, both the old and the new. *The time is coming when there will be a sharp division between professional and purely commercial pharmacy.*

It will not be to-day, it may not be to-morrow, but the separation will be surely made, and it behooves those who elect to follow a profession to set themselves apart from those who devote themselves to the ideas and methods of trade.

One is as honorable as the other, but the routes to the goal are different, and few can win success in more than one line of endeavor, and as the line of dispensing is on the professional route, those who elect to follow that route must qualify and *keep qualifying themselves*, as they travel it, if they hope to reach the goal.

MINUTES

OF THE

SECTION ON HISTORICAL PHARMACY.

SATURDAY MORNING, MAY 7, 1910.

The Section on Historical Pharmacy was called to order at 10 : 15 a. m. by Chairman Eugene G. Eberle, of Texas, who proceeded to read his address as Chairman as follows :

CHAIRMAN'S ADDRESS.

The address of the Chairman of the Historical Section is usually considered perfunctory duty but you will admit of a few suggestions which he thinks will perhaps be of some value to the Association. Some, and perhaps most of the ideas have been pronounced in the work this Section has been doing. Biographical sketches of men prominent in pharmacy have been collected together with letters, writings, etc. This should continue a purpose of this Section, and should be of more direct interest to those who have lived in the same community with the deceased; the contributor should add his comment on the useful life that has passed out. In this connection the additional suggestion is made that men who are prominent to-day in the various branches of pharmaceutical work, write their autobiographies. These need not be read if so requested, nor is it essential that they be presented, but let the contribution be available at a designated time for use of the Association.

Again, histories of associations, boards of pharmacy, schools of pharmacy, etc., are written most accurately while those are still living who have played a part. It has therefore been the endeavor of the Chairman to arouse an interest of this kind, resulting possibly with some degree of success, for in recent years such historical data have appeared in a number of State Proceedings. The same suggestion applies to drugs and preparations; every year finds its quota. Comparatively few remain with us while some that are discarded attract attention in later years with little available authentic reference. This of course only applies to those of local use, for more extended application brings these to the consideration of associations and the press.

Since first writing this report, that of the Historian has come to hand and includes perhaps what were in the mind of the writer the more important items to be noted, and as these are better stated by him, they have been eliminated from the Chairman's report, except this immediate reference. It is a most difficult matter to arouse interest for this Section. To what in particular this indifference is due, we can not say but it may be the impossibility of publishing more than the simple notice that such contribution was received.

It is unnecessary to refer to the need of authentic historical data; perhaps their

greatest value, the writer discerns in the analysis of future possibilities and conditions, for development and progress are not by straight lines. We should have a true conception of the past, not only the glitter, but as Tennyson states it, the frosty dark, and reversely, those who only see the beclouded past should be able to recognize the glimmer. We may see before us a brighter future, while others are extremely doubtful, and withal we should realize that there is a deliverance from every unfavorable condition, not only of our lives but our profession, when we have fitted ourselves to accept it. History is a good reference and compend and therein, aside from other interest, is its value.

The work of the Chairman has not been arduous; he has written many letters requesting contributions, with some responses that are presented by the program of the Section. He will not call attention to any of these in particular, except to say that the historical sketch of the Idaho Pharmaceutical Association came to him after the meeting at Los Angeles, and the sketches of the Presidents of the Arkansas Association have appeared in print. The writer has in hand further contributions on early pharmacy in Texas, but not sufficiently complete for presentation.

Secretary Dunn called for action upon the Address just read, and Mr. Motter, seconded by Mr. Hancock, moved to receive and refer for publication. So ordered.

The Chairman called for the report of the Historian as next in order, and Mr. Kremers made his report as follows:

REPORT OF HISTORIAN.

The work of the Historian during the past twelve months has taken its usual course: the collection of new material, and the classification of material already in hand so that it can be properly stored and used.

In the collection of material two members of the Association have continued to take a special interest. Mr. Mayo has sent a number of photographs and Mr. Whelpley has sent miscellaneous documents as well as forwarded several boxes of documents collected by Ex-Treasurer S. A. D. Sheppard.

In the work of arranging material on hand, your Historian has been ably seconded by Miss Nellie Wakeman. At the Hot Springs meeting the Council voted \$25.00 for mounting paper and covers, and an additional \$25.00 for clerical assistance. In order that this work may be made effective it ought to be continued without interruption. At the present rate of progress the material now on hand cannot be gotten into a proper working condition within ten years. It is to be hoped, therefore, that the Section will request the Council to make a like appropriation for next year.

The transfer of Ex-Treasurer Sheppard's books and papers and their disposition with the Historian, suggests the consideration of the advisability of having the books, correspondence files and other papers of all of the offices of the Association at large, and possibly of the sectional officers, transferred to the archives of the Association after the lapse of a given number of years. No doubt, much material that would shed considerable light upon the past history of our Association and of American pharmacy at large has been lost or even wilfully destroyed. The use of such material should be suitably restricted by special action of the Council or of the Association in general session assembled.

Another matter, which ought to receive the immediate attention of the Section, and later of the Association at large, is that of a library. Upon inquiry your historian has learned from the General Secretary that but few of the organizations which receive complimentary copies of the Proceedings send anything in exchange. This state of affairs is as undignified as it is extravagant. Your historian would therefore urge that this Section recommend two things to the General Session.

1. That the General Secretary be instructed to discontinue sending copies of the Proceedings to sister associations and other organizations that send no publications of their own in exchange.

2. That the office of librarian be established, and that a librarian be elected by the Council. In co-operation with the General Secretary and a member of the Finance Committee, it ought to be his duty to receive as large an exchange list as possible and thus to build up a library for the Association. Inasmuch as Washington is to be the home of the historical collections in the near future, it might be best to elect as librarian a member from that city. Whether such a library had better be placed with the Washington Section is a matter to which the Historical Section should give due thought before making a recommendation to the General Session.

If one reflects how many books and pamphlets have been lost to the Association in the past fifty years and more, simply because there was no one whose specific duty it was to preserve them, it takes but little imagination to construct a library of great value that we might have saved.

In accordance with a suggestion made by your Historian to the President, the Chairmanship of the Committee on our historical collections at Washington was transferred to a member resident in that city. We may expect, therefore, that our interests in that direction will be carefully guarded now that the National Museum is approaching its completion. As soon as the old National Museum building will have been reconstructed, it will be necessary to transfer our collections to Washington. At that time it may become necessary to appoint a custodian. Before this is done, however, a complete understanding with the Assistant Secretary of the Smithsonian Institute, who is in charge of the National Museum should be arrived at. Possibly this important matter can be turned over in due season to the Committee now looking after our interests at Washington. With a Librarian, a Custodian and an Historian, each an enthusiastic member in his particular field, our historical interests ought to be well taken care of in the future.

To recapitulate briefly. 1. The Section ought to ask for the continuation of the assignment of the regular allotment for historical work, as given above. 2. Our exchange ought to be placed on a dignified basis and the most ought to be made of this possibility to create a library. 3. The advisability of creating the office of Librarian ought to be carefully considered.

Respectfully submitted,

EDWARD KREMERS, *Historian*.

The Chair called for action upon the report just read, and said there were a number of recommendations contained in it, which the Section should take cognizance of and act upon. He said if the Section was to be made as useful as it should be, the same attention would have to be paid to it as in other Sections. He called on the Historian, as being more familiar with his report to state the recommendations contained.

Mr. Kremers said he would reverse the order of the recommendations, taking the last first; and that recommendation was, that this Section consider the advisability of asking the Association in general session to take such steps as might be necessary to secure a desirable depository for, and permanent care of, the documents that had been accumulated since the year 1880, at least, by the Chairman of the Revision Committee of the U. S. P. He said he thought the Section should consider the advisability of having these documents turned over to the American Pharmaceutical As-

sociation, or whether, preferably, they should be turned over to the Smithsonian Institute. He thought some positive suggestion should be made along this line, and moved the adoption of this recommendation.

Mr. Hancock seconded the motion.

Mr. Wilbert thought it would be desirable to have these documents deposited somewhere where they would be preserved for fifty or a hundred years to come, as these papers were likely to be extremely valuable in the future. He doubted the policy of filing them with the Smithsonian Institute, and thought the Association should make provision to preserve them and have charge of them. He asked Historian Kremers if it would be possible for him to undertake the preservation of these documents along with the material already in hand, until suitable permanent quarters could be found in the future. He said he understood the Historian had facilities for storing matter in a fireproof building for the time being, and he thought it would be well to ask the Association to have this material so deposited, if agreeable to the Historian.

Mr. Kremers responded that for a number of years past they had been in communication with the Smithsonian Institution, asking for space in the old building whenever the new building was completed, for the deposit, and possibly the exhibition, of such material as might be or had been collected, and said promise had been made of such space in the old building when the material there house was transferred to the new building. He also said there was a committee of the general Association to look after this matter. Mr. Kremers went on to say that, since 1902, when this work was organized in Philadelphia, the Historian had collected a lot of material, which had been stored in a fire-proof building of the Library of the Wisconsin Historical Society. He thought this space might be made available for the time being.

Mr. Hancock suggested that, as this matter was in an embryonic state, it would be well to let it remain in the hands of the Historian until it could be more maturely considered. There was no particular haste about it. He asked the Historian whether, if the desired space were given, it would be the property of the Institution, or be at the demand and service of the Association.

Mr. Kremers replied that this matter had been left entirely open; that the Assistant Secretary of the Smithsonian Institution, with whom the correspondence has been had, had stated that it was impossible for the Institution to give any space at the present time, and it was not necessary to cross that bridge at this time. He asked that if any of the members knew of anyone having matter which would be a valuable contribution to the historic collection, but the title to which he did not wish to part with, he would be glad if they would say to such parties that this Section would be glad to take such material on deposit for the time being.

After some further discussion as to the disposal of this historical matter

until permanent arrangements could be made, participated in by Messrs. Hancock, Wilbert, Roehrig, the Historian and the Chairman, the Chair put the vote on the recommendation to request the Association in general session to take the necessary steps to have the criticisms of the last two Pharmacopœias placed in charge of the Association, and it was carried.

Historian Kremers said the next recommendation was in reference to the creation of the office of Librarian, and he expressed the opinion that in such election the matter of permanent location of a Library should be considered, as, naturally, the Librarian should be chosen from such locality. He moved that the Section recommend to the Association in general session the creation of the office of Librarian.

This motion was seconded by Messrs. Hancock and Wilbert, and carried.

Mr. Kremers suggested that perhaps discussion might be had here as to the place where the Library was to be kept.

Mr. Wilbert thought the time was inopportune to discuss this question, until the Association had sufficient funds to provide and equip a building for the purpose.

Mr. Mayo did not agree with Mr. Wilbert in this view, and thought it would be wise to discuss the matter, in carrying out Historian Kremers' views. He said he took it that the duties of the Historian had already become so onerous as to make it desirable to divide them, and separate the duties of the Historian proper from those of Librarian. He thought it would be well for this Section to express its opinion as to the desirability of continuing the Library with the Historic Section. It might be that someone could be selected for Librarian who would aid in this work, and he for one would like to hear some expression of opinion in this respect.

Mr. Kremers said Mr. Mayo had given him credit for more work than he had done; that he had carefully avoided assuming the duties of a librarian, and had left in the hands of the General Secretary, who had charge of the exchange of volumes, etc., all such matters. The Secretary could turn over from year to year to the Librarian appointed such books as he received.

Mr. Mayo moved that it be declared the sense of the Section that Washington City would be a desirable place for the location of the proposed Library. He said it would eventually have to go to Washington, anyhow.

Mr. Wilbert said he would be willing to discuss Mr. Mayo's motion as far as desirability was concerned, but so far as practicability was concerned he doubted it very much.

Mr. Hays asked if it was not just a little bit absurd to say that Washington was a desirable place, when in the same breath it was said that it was not practicable to have it there. It seemed to him it was desirable to have it where it was practicable to have it. He thought the Historian could tell the Section something on this point.

Mr. Mayo said it was not impracticable to have it at Washington, and that he was under the impression that some members could be found in Washington who would say they would give house-room for the present small library.

Mr. Kremers said he had been thinking of Washington, and Washington only, as the proper place, and thought that, while it might be somewhat inconvenient to house a hundred volumes or so, somebody could be found in Washington who would do that; and if only once a Library was started, with, say, 500 volumes, or even less, he felt sure the Association would then provide a place for it. He also thought that the selection of a Librarian from Washington would be a good move, in that probably he could make suggestions as to the desirability of a location in Washington.

The Chair then put the vote upon the motion as made and it was carried.

Mr. Wilbert said that, considering the immediate future only, he wished to go back to the proposition of Madison, Wisconsin. There, he said, they had the most satisfactorily arranged pharmaceutical library in the country, and the best of systems, and the Historian could possibly get the Librarian of the University of Wisconsin to take an interest in this matter, and agree to house temporarily this collection of books, and then the Association would have at least in some one place in the United States a fairly respectable pharmaceutical library. It was common to speak of the United States as the greatest country on the face of the earth, and yet it had not a good pharmaceutical library. Surely there ought to be some place where, under the auspices of a good librarian, the nucleus of a pharmaceutical library could be gathered, and that nucleus developed into a real library.

Mr. Kremers said there was a practical difficulty which arose in this behalf. They had built a fine, fire-proof building at the University there, at an expense of over \$600,000, and supposed they would have space enough for twenty-five years to come, but in twelve months' time they began to feel crowded. For this reason it was not an easy matter to secure from the Library Board permission to store this material, and he expressed the hope that he would not be asked to solicit more space than was necessary for the storing of the documents that *must* be kept in a fire-proof place.

Thereupon Mr. Mayo moved that the Chair appoint a committee of three to investigate the question of finding a location for the deposit of such books as were now on hand, and report at the next annual meeting, so that the members would be in a position to discuss this matter at that time. He suggested that temporary provision might be made for such material as the Association now had in the Surgeons' Library in Washington. He said he had a talk with the Chief Surgeon of that department on his way to this meeting, and he had informed him that the library had a complete collection of the pharmacopœias of the world, and also of the

United States Pharmacopœia, and he promised to make an exhibit of same at the Willard Hotel or at the Surgeons' Library during the Pharmacopœial Convention in Washington next week, and he thought from his general attitude he would probably be willing to give space in the library for the time being for such matter as the Association had collected up to this time.

Mr. Kremers said he would be glad to second this motion, if Mr. Mayo would accept an amendment that the Librarian to be elected by the Association be made Chairman of this Committee.

Mr. Mayo agreed to this, and the motion was so put and carried.

The Chair stated that of course this committee could not be appointed until the Librarian was selected.

The Chair called for the report of the Secretary of the Section as the next order of business, but Mr. Dunn said that he had prepared no written report.

The Chair stated that the first paper on the list was one entitled, "History of Yerba Santa and Cascara Sagrada," by J. Winchell Forbes, but the author of the paper was not present.

Thereupon Mr. Wilbert moved that the paper be accepted and filed with the Historian, and this motion prevailed.

The next paper was an Autobiography of P. C. Candidus.

The Chair stated that he supposed all the members had seen this paper, as it was published in the pharmaceutical journals, and he had simply pasted it in a folder, with a letter from Mrs. Candidus, that it might be preserved, and he would ask that it be accepted in that way. So ordered.

A paper entitled, "A Suggestion to the Historical Section," was read by the author, Wilhelm Bodemann.

The Chair stated that this paper contained a good recommendation, viz; for the establishment of "Veteran Associations" in different sections of the country. He thought if such a suggestion was acted upon, it would add to the Historic Section of the American Pharmaceutical Association.

Mr. Mayo thereupon moved that the Secretary be requested to transmit copies of this paper to the Secretaries of the several Branches, and this motion was seconded by Mr. Roehrig.

Mr. Kraemer said he was very much interested in Mr. Bodemann's paper, and would like to know what he considered a "veteran." Mr. Bodemann replied that the Association had started off by enrolling all those who were in business in Chicago before the Fire, and when these began to drop off, they made it at least twenty years in business, each member being required to furnish an autobiography.

Mr. Payne said that Mr. Bodemann had so much experience along this line that he would like to have him decide upon some line between "veterans" and ordinary men. Some of the members had not had a "fire," and he wanted to know who would be eligible for membership.

Mr. Bodemann responded that when a set of veterans got together, they ought to be "red-hot enough to start up a fire any time." (Laughter)

The Chair then put the vote upon Mr. Mayo's motion that a copy of the paper be sent to each of the Branches of the American Pharmaceutical Association, and it prevailed.

A paper entitled, "Historical Sketch of Idaho Pharmaceutical Association," by F. E. McClure, the Chair stated was one that had been given him at the Los Angeles meeting, and he had had it printed and put in shape to be filed. The author was not present and the paper might be referred to the Historian. So ordered.

"Historical Sketch of Colorado Pharmacal Association," a paper by S. L. Bresler, was not read at the moment, because of the author's absence. Later, Mr. Bresler came into the room, but said he did not care to read his paper, and suggested that it simply be filed. So ordered.

A paper entitled, "Historical Sketch of Texas Board of Pharmacy," by R. H. Walker, the Chair stated simply gave a synopsis of the work done by the Board, and was submitted to be filed of record. He stated that while the paper was brief, it was quite complete.

The next paper called for was one upon "The Cultivation and Distillation of Wormwood in Wisconsin," by J. E. Simons, and in the absence of the writer, Mr. Kremers passed the paper around among the members, that they might take a look at the figures it contained. He said that what he desired to say about this particular industry in Wisconsin was in regard to its origin. Wormwood had been distilled now in considerable quantities for more than fifty years, on a farm not far from Madison, by three generations of the Drew family. The grandfather of the present operator, who gave most of his time and attention to this present industry, lived in Vermont, if he remembered correctly, and was a distiller of rum. One day he discovered a neighbor's boy, a young man of from twenty to twenty-one years, coming home drunk, and he told his wife that he would never distill another drop of rum, as he considered it a contribution to the immorality of the community, and he would not make money in that way. This left him with a copper still on hand, and he felt that he had to make some use of it, and looking about him to find some such use, he hit upon the distillation of wormwood. Then when the family came West, this distillation of wormwood was continued, and had continued now for three generations. A hundred acres of wormwood were employed in a single season, in the distillation of this oil. Mr. Kremers went on to give a brief description of the crude, primitive methods employed in this distillation, following traditional lines, rather than lines of modern scientific development.

The Chair stated that the paper would take the usual course, and be filed with the Historian.

The Chair said the next subject for presentation before the Section was

that of some suggestions for the filing and binding of the U. S. P. Revision criticisms, by Mr. Kremers.

Mr. Kremers explained his subject in detail, with a practical demonstration of the improved filing system he had devised, showing how he could file fifty circulars at a time, keeping the circulars separate and distinct. He also explained his improved method of binding.

Mr. Wilbert thought it might be well in this connection, if practicable, to suggest to the Revision Committee that they change the style of their circulars. He said at the present time a great deal of the mimeograph-work was done on eight-and-a-half by eleven-inch paper, and it made a very satisfactory sheet also, and also the work of the Council of Pharmaceutical Chemistry. He thought it would be well to bring this to the attention of the Chairman of the Pharmacopœial Revision Committee, in the hope that they would adopt a sheet of this size, which would be more convenient and readily handled.

Mr. Payne congratulated Mr. Kremers on his suggestion. He said he had had considerable experience along this line. He thought that, while Mr. Wilbert's suggestion was a most excellent one, there was a reason for the use of the large sheet, and that was, in some classes of apparatus, to produce these reprints it was much more convenient to use a large sheet, and make one impression, as to the use of the smaller sheets involved more mechanical skill in the printing and filing. He thought this was the chief reason why the larger sheets were used.

Mr. Kremers said he did not mean to present his scheme as a justification for the large sheet. It was simply a way out of a very awkward situation; and for those who wanted to keep these records and make them useful, it furnished a method of disposing of them that was convenient and practicable.

And so the matter was passed.

The Chair stated that the next item on the program was "A Catalogue of Illustrations of Historical Apothecary Shops," by Edward Kremers.

Mr. Kremers said he would not read a paper, but simply desired to state in connection with the title that he had illustrations of apothecary shops running back to the Fourteenth Century. These illustrations, he said, were scattered all through, pharmaceutical literature, mostly of the past century, and were found elsewhere as well. They were not readily available. Some of them were reproductions in works on civilization, and other books where they would be least expected. The object was to make this material available to the student of the drug-store. He said these illustrations were by far the most important documents to be had upon the historic development of the drug-store; that it was an interesting subject to those who were historically inclined, and the study had also an æsthetic side, because of the paintings and wood-cuts employed, as well as the more modern forms of reproduction.

The Chair stated that the next item upon the program was a contribution to the Rice Correspondence, by J. O. Schlotterbeck.

In the absence of the author, Historian Kremers presented this subject. He said the list contained letters written by Rice to Prescott. He was reminded of a remark made by the Historian of the Chicago Veterans' Association some months ago, to the effect that the best of history was autobiography, and that we had none of that by such men as Rice or Parrish or Procter. Although it had been a most difficult thing for the Historian of the Section to get at, the autobiography of these men was written in their letters. It was not in the most complete form, possibly, but anybody interested in these men would find these letters more charming than any autobiography could be. An autobiography had its value as supplemental to such letters, of course ; but nothing could take the place of letters that were written with no purpose whatever as to the future. Mr. Kremers went on to say that the letters were arranged in chronological order, and explained how any addition to this file could be easily inserted at the proper place, under the arrangement observed. He also explained that, in case a member wanted to know something, say, about the development of Pharmacopœia revision in 1880, and it was found that Rice had written a letter to Prescott on such subject, it would not be necessary to send such member the whole volume and jeopardize it, but any single letter could be taken out, without danger of losing the rest. Continuing, Mr. Kremers urged upon the members present that if they had in their possession, or knew of others who had, letters of this character, that they bundle them up and send them to the Historian at once, and not wait to find some convenient time to go over them and arrange them in order ; that it was his business to see that this was done, and he would gladly do it.

The Chair here filed with the Historian some Searby letters, presented by Albert Schneider, of San Francisco.

The Chair then called upon Henry Kraemer to present some additional Rice letters that he had in his possession.

Mr. Kraemer, in offering these letters to the Section, said that as the time of the meeting was approaching, he was reminded of a time in the life of a great leader of American pharmacy ; and while he was not here then years ago, he was always with the Association in spirit, and he felt that he always would be, and he confessed that he felt as though he must have these letters with him at this meeting. He began to realize that life was fleeting, and that the only proper duty of one who really appreciated the services of Rice was to present such letters as he might be able to gather to the Association. He said he did not care to show some of these letters at this time, and that there were others he would get together as soon as possible. Mr. Kraemer went on to say that he believed it was the duty of all the members to present such letters to this Section. He said he also had some Searby, Hoffman and Ebert letters, which he would present.

Continuing, and referring to the proposition heretofore discussed of the selection of a site for a Library of the Association, Mr. Kraemer said he was reminded of a letter from Albert E. Ebert in connection with the Procter Memorial Fund. He quoted from it to show that Ebert favored the raising of a fund of \$100,000, the interest only of which was to be used in defraying the expenses of the Association. He especially desired to point out that such a conservative man as Ebert thought it was feasible to raise such a sum. He thought that when it was realized that the American Society of Science was back of the proposed "Washington Memorial," which would certainly be built some day, to be used for the purposes of scientific bodies, it was a reminder that the time would come when there must be some central place for a History of American Pharmacy. He referred to this matter at this time because he was not sure but that the Monument Committee might see fit to have some more enduring monument than the one heretofore outlined. Mr. Kraemer closed by saying he was glad to present these letters to the Association at this time.

Mr. Mayo was here given the opportunity to present a matter of historic interest of local flavor. He said the City of Richmond was founded by William Byrd, of Westover, Virginia, and that he held in his hand a rare contribution to literature in the shape of a report by Col. Byrd—who might be called the first American author—in which he recorded his observations made during a survey of the boundary-line between Virginia and North Carolina. This book, he said, published in 1730, and entitled "History of the Dividing Line Between Virginia and North Carolina," was not only very interesting from an historical point of view, but was of special interest to pharmacists, as frequent reference was made to the flora of the country through which he passed, including many plants of medicinal interest. Mr. Mayo said he had in his library at home upwards of two hundred specimens of plants, such as were described in this book. His personal interest in the matter lay in the fact that the first Mayo in the United States was Major William Mayo, who was a surveyor on this line, and to whom Col. Byrd referred in his book as having laid out "the city afterwards called Richmond."

The Historian said that before the matter of Mr. Kraemer was disposed of, he wanted to call the attention of the members to the fact that those of them who might happen to have documents to which they were not willing to give publicity at this time should not be deterred from sending them in to the Historian for that reason, as he had more than one package in his possession, sealed and marked not to be opened until a given time. Any request of this sort would be duly respected, and nobody would see the contents of such books or documents, not even the Historian himself, until the date given had expired.

Mr. Hays contributed letters of Maisch, written in 1871 and 1872, and from Ebert, that he had found in the correspondence of J. B. Moore, a

prolific writer and one of the oldest members of the Association, who had died a few months ago, leaving a number of unfinished manuscripts and rough drafts of same. His son had invited him to go through this mass of matter, and he had found these letters. He also filed a clipping contributed by Mr. Mayo, in regard to the meeting in New York, which he said was history, because he believed it was the only thing that the New York people had had to say about the meeting. He also filed certain newspaper clippings, etc., and also a contribution in regard to the attitude of the Massachusetts Board of Pharmacy on the liquor question some years ago, with a typewritten statement of ex-President Whitney of his position on this question—a matter which provoked a great deal of criticism at the time.

The Historian used the contributions and statement made by Mr. Hays to emphasize again the importance of making contributions to this Section. Not all were commercially inclined, he said, so they could contribute to the Commercial Section, while others were not scientifically inclined, and could not contribute to the Section on Scientific Papers, but every member of the American Pharmaceutical Association was likely sometime to run across matter that would be of value to this Section, and he urged that such documents be filed with the Historian. He commended the course of Mr. Hays in bringing such material before the Section, with brief verbal explanation of its origin and character.

A paper entitled, "The History of the Arkansas Association of Pharmacists up to 1888," by W. W. Kerr, was reported by the Chair in form for filing.

A paper on "On Officers of the Nebraska Pharmaceutical Association to Date," by D. J. Fink, was likewise filed.

A paper entitled "A Brief History of Pharmaceutical Legislation in Pennsylvania," was presented in abstract by the writer, Louis Emanuel, and filed.

"A Brief History of the Massachusetts Board of Pharmacy," by J. F. Guerin, was presented in synopsis and referred for filing.

The Chair next called upon E. V. Howell, of North Carolina, to present a series of papers on the program, and Mr. Howell said he would present these in brief abstract, beginning with the last one on the list. He presented papers on the following subjects:

"Yaupon, the Tea of the Aborigines of America, and its Caffeine Content."

"Sketch of William Bartram, of Pennsylvania (Botanist, 1730-1823)".

"Sketch of John Clayton, of Virginia (Botanist, 1685-1773)".

"Wheaton's Method of making Quicksilver Ointment, 1808."

A paper by W. C. Coker, "Sketch of Thomas Walter of South Carolina, (Botanist, 1730-1778)" was also filed; as was also a paper entitled, "A list of Medical Plants grown by W. C. Coker, University of North Carolina Arboretum."

A paper entitled, "A Brief History of the Indiana Pharmaceutical Association," by Maurice P. Schwartz, was received and filed.

"A Condensed History of the Wisconsin Pharmaceutical Association," by E. B. Heimstreet, was a paper likewise received and filed.

The next paper on the program was one entitled, "Presidents of Arkansas Association of Pharmacists," by Miss Mary A. Fein, which was received and filed.

The Chair had called upon E. J. Kennedy, of New York, to present some caricatures from the files of the *Pharmaceutical Era*.

Mr. Kennedy said he had not prepared a paper on this subject, as he had not the time, but the Historian had asked him by letter to say something on the subject of such caricatures, and he had run across some of these sketches and had brought them along. He exhibited a sketch of Henry Canning, caricatures of four presidents of Pharmaceutical societies in New York, and of Messrs. Anderson, Sheppard and others.

"History of U. S. P. Drugs" was the title of a paper by John Uri Lloyd, which was read by title and filed.

A paper upon "Proceedings of the Silver Jubilee Meeting" was likewise received and filed.

The next paper called for was one by Mr. J. F. Hancock, entitled, "History of the Maryland Pharmaceutical Association."

Mr. Hancock said he would not read the paper, as it was scarcely worth while to take the time of the Section, but it would be put in form and presented to the Historian. He said that the inspiration of the State Pharmaceutical Association to begin with was this Association; that a committee was appointed to consider the subject of legislation, and the draft of a model law was presented, which was gotten up with great care, and Maisch contributed largely to it. It was presented to the Association and very vigorously discussed, but it was considered not to apply to the needs of all the States, and that there would be need of modification in many of the States adopting a pharmacy law. This was 1867, and was the beginning of many of the State Pharmaceutical Associations. The first Pharmaceutical Association founded was that of New Jersey, in 1870. The Maryland Association was not formed until 1883, and the first law that was passed (1872) applied only to the city of Baltimore.

The Chair stated that the next paper on the program was one contributed by Otto Raubenheimer, entitled, "Biography of Friedrich Hoffman, originator of Hoffman's Anodyne," and the other, "Biography of Karl Friedrich Mohr." He said the author was not ready to present these papers, and that he understood they would be filed with the Historian later.

The Chair stated that this concluded the list of papers before the Section.

Mr. Cliffe said he was constrained to admit delinquency on his part in regard to the request preferred by the Historian, in relation to some ma-

terial collected during the Semi-Centennial of the Association in Philadelphia, in 1902. He said he had on file quite a lot of material, which he agreed should be placed with the Historian, and promised that he would take immediate steps when he returned home to see that he got it.

Mr. Hancock presented a photograph of T. Roberts Baker, of Virginia, a former officer of the Association, and said he had gotten some important data that he would use in writing out a sketch of Baker. Baker, he said, was born in Richmond in 1825, and at the age of fifteen entered a pharmacy in the City of Richmond. He graduated from Philadelphia College of Pharmacy in 1852, the year this Association was organized, and returned to Richmond and went into business. In 1852 the firm of Mead & Baker was organized, and became the well-known establishment. Later on, he entered the manufacturing business.

The Chair brought up the question of an appropriation for the Historical Section, but the Historian expressed the opinion that this could be arranged through the Council, without action by the Section, and Mr. Wilbert concurred in this view.

The Chair called for nomination of officers of the Section as the final order of business.

Mr. Wilbert proposed the name of John A. Dunn, of Brooklyn, the present Secretary of the Section, for the office of Chairman, but Mr. Dunn declined, on account of age and present infirmities. Mr. Wilbert said he had in mind this possible objection, and suggested that Mr. Raubenheimer, an inveterate worker, might be nominated for Secretary, and Mr. Dunn would be saved all writing. Mr. Dunn insisted upon his declination, however, and the matter was not pressed.

Thereupon Mr. Cliffe nominated J. L. Lemberger, of Lebanon, Pennsylvania, for Chairman, and this motion had several seconds.

On motion, nominations for Chairman were closed, and Mr. Hancock moved that the Secretary cast the affirmative ballot of the Section electing Mr. Lemberger its Chairman. This motion was put and carried, the Secretary announced that he had cast the ballot as directed, and the Chair declared Mr. Lemberger duly elected Chairman of the Section for the ensuing year.

Mr. Wilbert nominated Otto Raubenheimer, of Brooklyn, for the office of Secretary. This nomination was seconded, and on motion, nominations were closed. On motion of Mr. Hays, seconded by Mr. Wilbert, the Secretary was directed to cast the affirmative ballot of the Section electing Mr. Raubenheimer to the office of Secretary. He announced that the ballot had been cast, and the Chair declared Mr. Raubenheimer duly elected.

Mr. Lemberger said he did not object to giving his time and labor to the American Pharmaceutical Association, but fully realized in accepting the position of Chairman of the Historic Section that there must be hearty co-operation on the part of the members in order to insure its success.

He knew of the good work that had been done in the past, and he wanted to ask the aid of the members in the work of the Section for the coming year.

Mr. Hays nominated Edward Kremers to succeed himself in the office of Historian, and this motion was seconded by Mr. Wilbert and Mr. Howell. On motion, nominations for Historian were closed, and the Secretary directed to cast the affirmative ballot of the Section electing Mr. Kremers to this office. The Secretary announced that he had cast the ballot as directed, and the Chair declared Mr. Kremers duly elected Historian of this Section.

Mr. Howell stated that, at the Los Angeles meeting last year, the Section had passed a resolution to the effect that the Association be asked to appropriate \$100 for the use of the Historical Section, and he wanted to know the fate of that matter, and whether the appropriation was made by the Council or not.

The Chair admitted that he did not know its fate.

Mr. Kremers suggested that the Section renew this request, and Mr. Hays duly seconded, so moved, and it was ordered that the Association be asked to appropriate \$100 for the use of the Section.

Mr. Wilbert moved that the Chairman of the Section, who was now a member of the Council, see that the matter of appropriation be brought before the Council. He said he thought this would be a good work for the Chairman to do.

No action was taken upon this suggestion.

The Chair stated that if there was no other matter to be brought before the Section, a motion to adjourn would be in order.

Mr. Wilbert so moved, and the Section stood adjourned.

ENTERTAINMENTS AT THE FIFTY-EIGHTH ANNUAL MEETING.

As was to be expected, the well-known Virginia hospitality was in evidence everywhere, from the highest state and city officials to the humblest citizen, and those members who ten years previous had attended the meeting in Richmond fully realized that the welcome accorded them was as natural as the glorious sunshine of the southern sky.

The President's reception, held at the Hotel Jefferson, was, as usual, largely attended and much enjoyed, for Dr. Rusby and his good lady did the honors of the evening in a charming manner. His Excellency, Governor Mann, also tendered the visitors a reception at his official mansion, where he and Mrs. Mann proved themselves genial hosts.

Numerous card parties and sight-seeing auto rides had been arranged for the visiting ladies, who on one day were also taken in cars to the battle-field of Seven Pines. One of the leading features of the week was a real southern picnic, held at Lakeside Park, where a bountiful supply of refreshments was served and those in attendance delightfully entertained by a genuine negro minstrel show.

Much amusement was afforded by the morning visits to the Police Court, where "Squire John" reigns supreme and administers justice daily, dealing out punishment and advice in his own peculiar and inimitable way to the malefactors brought before him.

Many thanks are due Local Secretary T. Ashby Miller and Mrs. Miller and their associates on the Committee of Arrangements.

One of the most interesting and at the same time instructive features of the meeting was the exhibition of a large number of living medicinal plants, many of which furnish official and others unofficial but popular drugs. To many of the visiting members this was the first opportunity of seeing specimens of plants heretofore known to them by name only, and the Association is under many obligations to the parties who so generously contributed their time and labor to make the exhibition a success.

The collection was chiefly contributed by the United States Bureau of Plant Industry, Messrs. Eli Lilly & Co. of Indianapolis, Professor Henry Kraemer and Professor H. H. Rusby. The New York Botanical Garden sent specimens of plants yielding cinnamon, camphor, vanilla, black pepper, coca, tea and coffee. Dr. Hoell Tyler sent from Redlands, Cal., flowering specimens of *Eriodictyon* or Yerba Santa. Professor L. F. Sayre

sent from Kansas a specimen of *Brauneria* (*Echinacea*) *angustifolia*. Professor E. G. Eberle sent from Texas, *Cynoglossum* *cicuta*, two specimens of *Artemisia* and a number of plants which arrived too late to permit of determination and labeling. Professor E. V. Howell sent from Chapel Hill, N. C., *Trillium* *erectum*, *Arum* and *Podophyllum*. Although a few specimens were duplicated by different contributors, most of them were represented by solitary specimens.

Spigelia or pink root was sent by the Bureau, Lilly & Co. and Howell. Two specimens of *Phlox* which are used as adulterants of pink root were sent by Lilly & Co., Kraemer and the Bureau, and the latter sent *Ruellia* *callicosa*, which is another important adulterant of this drug. *Digitalis* was sent by Kraemer and Lilly & Co. Peppermint, spearmint, elecampane, *Hepatica* *triloba* and *Porteranthus* (*Gillenia*) *trifoliata* by the Bureau and Lilly & Co.; *Hydrastis* by the Bureau, Kraemer and Lilly & Co.; tansy, lily of the valley, blue flag, calamus, burdock, geranium, *cimicifuga*, blood-root, sumach and *arum* by the Bureau, Lilly & Co., and Rusby; *belladonna* and *Rumex* *crispus* by the Bureau and Rusby; black haw, wild cherry, white oak, flowering dogwood, sassafras (from both staminate and pistillate plants), mandrake and *Triosteum* *perfoliatum* by Lilly & Co., and Rusby.

In addition to the above plants the Bureau sent the following :

Cypripedium *hirsutum*, *Hyoscyamus* *niger*, *Thymus* *vulgaris*, *Artemisa* *absinthium*, *Carum* *carvi*, *Lavandula* *vera*, *Chelone* *glabra* (*Balmoney*), *Levisticum* *officinale*, *Nepeta* *cataria*, *Foeniculum* *vulgare*, *Mentha* *citrata*, *Mentha* *crispa*, *Mentha* *longifolia*, *Pyrethrum* *cineraraefolium* (*Dalmatian Insect Powder*), *Monarda* *fistulosa*, *Baptisia* *tinctoria*, *Glycyrrhiza* *glabra*, *Pycnanthemum* *albescens*, *Rubia* *tinctoria* (*Madder*), *Althaea* *officinalis*, *Salvia* *officinalis*, *Rhamnus* *purshiana*, *Panax* *quinquefolium* (*Ginseng*), *Valeriana* *officinalis*, *Iris* *florentina*, *Colchicum* *autumnale*, *Conium* *maculatum*, *Collinsonia* *canadensis*, *Calendula* *officinalis*, *Caulophyllum* *thalictroides*, *Aristolochia* *serpentaria*, *Chamaelirium* *luteum*.

Messrs. Lilly & Co. sent *Odostemen* (*Berbis*) *nervosa*, one of the Oregon grape roots, *Hepatica* *acutiloba*, shepherd's purse, *Polemonium*, *Mitchella*, *Jeffersonia*, *Senecio* *aureus*, *Bicuculla* *canadensis* or squirrel corn, *Gnaphalium* *obtusifolium*, *Aesculus* *glabra*, *Cercis*, *Hydrangea*, *Trillium*, *Equisetum* *hyemale*, *Aralia* *nudicaulis*, *Asarum* *canadense*, *A. reflexum*, yarrow, tulip trees, mullein, Virginia creeper, paw-paw, witch hazel, dandelion, poke root, beech drops and common plantain.

Professor Kraemer sent aconite, pleurisy root, blue passion-flower, yellow jasmine, male fern, senega and *Brauneria* (*Echinacea*) *purpurea*.

Dr. Rusby sent *Xanthorhiza*, the pink-flowered form of *Cornus* *florida*, two species of Solomon's seal, *Rumex* *obtusifolia*, butternut, *Veratrum* *viride*, *Dracontium*, *scopola*, *Euonymus*, white willow, moon seed and *Actaea* *alba*.

APPENDIX.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED BY THE TREASURER FOR ANNUAL DUES OR CERTIFICATES, FROM JULY 1, 1909, TO JULY 1, 1910.

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Abbett, Wm. A. ....'09	\$5 00		Amount brought forward	\$370 00	
Abreu, Gerardo F. ....'09	5 00		Baribault, E. S. ....'10	5 00	
Ackerman, Philip J. ....'10	5 00		Barnard, Harry A. ....'09-'10	10 00	
Ackermann, Albert G. ....'09-'10	10 00		Barnes, Chas. D. ....'09	5 00	
Adamick, Gustave H. ....'09	5 00		Barnes, Henry C. ....'10	5 00	
Adams, Arthur E. ....'09	5 00		Barrett, Chas. L. ....'08-'09	10 00	
Alacán, José P. ....'09-'10	10 00		Bartley, Elias H. ....'09	5 00	
Albers, William W. ....'09	5 00		Base, Daniel. ....'10	5 00	
Allen, Alonzo W. ....'09	5 00		Baskette, Frank E. ....'08-'09	10 00	
Allen, Bertram ....'09-'10	10 00		Bastian, Otto C. ....'09	5 00	
Allen, E. Floyd ....'09	5 00		Basye, Taylor C. ....'09-'10	10 00	
Allen, Huestus B. ....'09-'10	10 00		Bateman, Herbert H. ....'09	5 00	
Allen, William A. ....'09	5 00		Baughman, Leo M. ....'09	5 00	
Allen, William E. ....'09	5 00		Baur, Jacob ....'10	5 00	
Allison, William O. ....'10	5 00		Beacom, C. Edwin ....'09	5 00	
Alvino, E. E. ....'10	5 00		Beane, Chester H. ....'09	5 00	
Amos, Wilber S. ....'09-'10	10 00		Beal, George D. ....'09	5 00	
Anderson, William C. ....'10	5 00		Beal, James H. ....'09	5 00	
Andreen, Carl. ....'09-'10	10 00		Bean, J. Arthur ....'10	5 00	
Andrews, George M. ....'09	5 00		Beas, Pierce B. ....'10	5 00	
Andrews, William A. F. ....'09	5 00		Beasley, Robert S. ....'07-'08	15 00	
Angell, James R. ....'09	5 00		Bechberger, Henry ....'09	5 00	
Anthony, Edwin P. ....'09-'10	10 00		Beck, Julius E. ....'09-'10	10 00	
Apmeyer, Chas. A. ....'10	5 00		Becker, Irwin A. ....'09	5 00	
Apple, Franklin M. ....'10	5 00		Becker, Maxwell M. ....'09	5 00	
Arkin, James A. ....'09	5 00		Behrens, John F. ....'10	5 00	
Armen, Chas. ....'10	5 00		Beilestein, Christian ....'09	5 00	
Armour, Elmer E. ....'09	5 00		Beise, John H. ....'10	5 00	
Arnold, Wm. C. ....'09	5 00		Bell, Edward F. ....'09	5 00	
Army, Harry V. ....'09	5 00		Bell, Jno. M. ....'09	5 00	
Asher, Philip ....'09-'10	10 00		Bell, S. Howard ....'09	5 00	
Austin, Arthur O. ....'09-'10	10 00		Bellack, Berthold H. ....'09	5 00	
Austin, F. A. ....'10	5 00		Bence, Eli ....'10	5 00	
Austin, K. G. ....'10	5 00		Bender, Walter C. ....'09	5 00	
Avery, Charles H. ....'09	5 00		Benedict, Philip V. ....'09	5 00	
Avery, Henry M. ....'09	5 00		Benfield, Charles W. ....'09-'10	10 00	
Avis, James L. ....'10	5 00		Benfield, W. Edwin ....'10	5 00	\$3 00
Ayres, Albert J. ....'10	5 00		Benkie, J. G. ....'10	5 00	
Baas, Geo. A. ....'09	5 00		Bent, Edward C. ....'09-'10	10 00	
Babcock, Percival W. ....'09-'10	10 00		Bentson, Bernard L. ....'09-'10	10 00	
Bachman, Gustav ....'10	5 00		Bentz, Henry G. ....'09	5 00	
Bacon, Ephraim ....'09	5 00		Berger, Ernest ....'09-'10	10 00	
Baily, G. Frank ....'09-'10	10 00		Berger, Louis ....'10	5 00	
Baird, Julian W. ....'10	5 00		Beringer, George M. ....'09-'10	10 00	
Baker, Edwin ....'10	5 00		Beringer, George M., Jr. ....'09-'10	10 00	
Baldauf, Julius L. ....'08-'09	10 00		Berlin, Henry ....'09	5 00	
Baldwin, Edward L. ....'09	5 00		Berner, Carl A. ....'09-'10	10 00	
Ballagh, Wilfred T. ....'09	5 00		Bernström, N. Gustaf ....'10	5 00	
Ballard, Chas. W. ....'09-'10	10 00		Best, Samuel M. ....'09	5 00	
Balser, Gustavus ....'09-'10	10 00		Bethea, Oscar W. ....'09	5 00	
Baltar, Joseph T. ....'09	5 00		Bettes, C. C. ....'09	5 00	
Baltzly, Albert B. ....'09-'10	10 00		Bexten, Edward W. ....'10	5 00	
Baltzly, Zachariah T. ....'09	5 00		Beyschlag, Charles ....'10	5 00	
Bandy, George ....'09	5 00		Bibbins, Francis F. ....'09	5 00	
Range, Otto F. ....'09	5 00		Biehl, Lewis A. ....'09	5 00	
Bank, W. C. ....'08-'09	10 00		Bierman, Clarence H. ....'09	5 00	
Barber, H. A. (Miss) ....'09	5 00		Biermann, Wm. H. ....'09	5 00	
Bard, Wm. E. ....'10	5 00		Bigelow, Clarence O. ....'09-'10	10 00	
Amount carried forward	\$370 00		Amount carried forward	\$730 00	\$3 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$730 00	\$3 00	Amount brought forward.....	\$1225 00	\$6 00
Bingham, Charles C.....'09-'10	10 00		Bugbee, Chas. A.....'09	5 00	
Bingham, William E.....'09	5 00		Burgheim, Jacob.....'09-'10	10 00	
Binz, Edward G.....'09	5 00		Burke, William T.....'09	5 00	
Biosca, Placido.....'09-'10	10 00		Burnham, Alfred A., Jr.....'10	5 00	
Birch, May C. (Mrs.).....'09	5 00		Burton, John C.....'09	5 00	
Bivins, Elliott A.....'09	5 00		Busch, H. P.....'10	5 00	
Black, J. A.....'10	5 00		Busch, Miers.....'10	5 00	
Blackman, W. M.....'10	5 00		Buschemeyer, Henry, Jr.....'09	5 00	
Blackwood, Russell T.....'09-'10	10 00		Butler, Guy.....'09-'10	10 00	
Blair, Henry C.....'10	5 00		Butters, Chas. H.....'10	5 00	
Blake, Harry W.....'09	5 00		Byerley, Fabrian.....'09-'10	10 00	
Blakeley, George C.....'08-'09	10 00		Cabitt, Harry.....'09	5 00	
Blakeslee, Louis G.....'09-'10	10 00		Cadmus, Robert C.....'09	5 00	
Blalock, Jesse N.....'09	5 00		Cahoon, Shirley.....'09	5 00	
Blanding, Wm. O.....'10	5 00		Calhoun, Will M.....'09	5 00	
Blank, Herman G.....'00	5 00		Calkins, Eleaser E.....'09	5 00	
Bletcher, Henry E. J.....'10	5 00		Call, Harry E.....'10	5 00	
Block, Anthony E.....'09	5 00		Camp, Eugene M.....'10	5 00	
Blocki, John.....'09-'10	10 00		Campbell, Andrew.....'09	5 00	
Bloomstein, Max.....'10	5 00		Campbell, Milton.....'10	5 00	
Blumenschein, Fred. J.....'09	5 00		Campbell, Theodore.....'10	5 00	
Bodemann, Wilhelm.....'09-'10	10 00		Campbell, W. W.....'10	5 00	
Bohn, George W.....'09	5 00		Cannon, C. C.....'10	5 00	
Bond, J. Emory.....'08-'09	10 00		Cantor, Lorenz.....'10	5 00	
Bongartz, Ferdinand A.....'09	5 00		Capdau, Pierre A.....'10	5 00	
Booker, Robert L.....'10	5 00		Capote, José.....'10	5 00	
Booth, Albert E.....'09-'10	10 00		Carleton, Henry L.....'10	5 00	
Borell, Henry A.....'09	5 00		Carnahan, J. H.....'10	5 00	
Bosque, Arturo.....'08-'09	10 00		Cartaya, Julio H.....'10	5 00	
Boulton, Emison A.....'09	5 00		Carter, Frank H.....'10	5 00	
Boutwell, L. T.....'10	5 00		Carter, Frederick L.....'10	5 00	
Bower, Edward A.....'09	5 00		Carter, Harlen W.....'10	5 00	
Bower, Edwin L.....'09-'10	10 00		Caspari, Charles, Jr.....'10	5 00	
Bowman, Kenneth B.....'09	5 00	3 00	Caspari, Chas. E.....'09	5 00	
Bowman, Reginald H.....'09-'10	10 00		Cassaday, Burton.....'09	5 00	
Boyken, John W.....'09	5 00		Cassaday, O. U.....'10	5 00	
Boyson, G. H.....'09	5 00		Cassell, R. L.....'10	5 00	5 00
Boyson, John H.....'09	5 00		Castelhun, Carl.....'09	5 00	
Bradbury, Wymond H.....'10	5 00		Chapman, J. T.....'10	5 00	
Bradley, Theodore J.....'10	5 00		Cheney, Arthur L.....'10	5 00	
Bradshaw, Henry A.....'09	5 00		Chism, John S.....'09	5 00	
Bradt, Warren L.....'09-'10	10 00		Christensen, Henry C.....'07-'08	10 00	
Brand, J. H.....'09	5 00		Clypham, Hesser C.....'09	5 00	
Brandenberger, Adolph.....'09	5 00		Clapp, Lowell T.....'10	5 00	
Brandes, W. C.....'10	5 00		Claren, George V.....'10	5 00	
Brandis, Ernest L.....'07-'08-'09	15 00		Clark, Albert H.....'09	5 00	
Brashear, James P.....'09	5 00		Clark, Alfred W.....'10	5 00	
Brecht, Frederick A.....'09	5 00		Clark, Ira B.....'09-'10	10 00	
Brehler, Oscar A.....'09-'10	10 00		Clark, Mallie A.....'09-'10	10 00	
Brennan, James E.....'10	5 00		Clarke, Chas. J.....'09-'10-'11	15 00	
Bresler, Simon L.....'09	5 00		Clarke, Chas. N.....'09	5 00	
Breslin, Michael T.....'08-'09	10 00		Clarke, Louis G.....'09	5 00	
Brewer, Howard D.....'08-'09	10 00		Claus, Otto F.....'09	5 00	
Briggs, Andrew G.....'09	5 00		Clayton, Abraham T.....'09-'10	10 00	
Briggs, Armand E.....'09	5 00		Cliffe, Wm. L.....'09	5 00	
Brinton, Clement S.....'09-'10	10 00		Cline, Raoul R. D.....'09	5 00	
Brisley, Harry.....'09	5 00		Clothier, C. Roland.....'10	5 00	
Bromme, William L.....'09	5 00		Clough, Chas. F.....'09	5 00	
Brookes, Virginia C. (Miss).....'09	5 00		Cobb, James W.....'09	5 00	
Brooks, George W.....'09	5 00		Cobb, Ralph L.....'09-'10	10 00	
Brooks, James M.....'09	5 00		Coblentz, Virgil.....'09	5 00	
Brooks, Phipps I.....'09	5 00		Cody, Nelson L. A.....'09-'10	10 00	
Brown, B. A.....'10	5 00		Coffman, Walter T.....'07-'08	10 00	
Brown, C. M.....'09	5 00		Cohn, Alfred I.....'09	5 00	
Brown, George S.....'07-'08	10 00		Colby, Chas. L.....'09	5 00	
Brown, J. Lee.....'09	5 00		Cole, Victor L.....'09	5 00	
Brown, L. P.....'10	5 00		Coleman, John H.....'10	5 00	
Brown, Lewis W.....'09	5 00		Collier, William K.....'07-'08	10 00	
Brown, Linwood A.....'09	5 00		Colson, H. W.....'10	5 00	
Brownlee, Sherman H.....'10	5 00		Colton, Edward T.....'09	5 00	5 00
Brucker, Carl.....'10	5 00		Comfort, Newton C.....'09	5 00	
Bruder, Otto E.....'08-'09	10 00		Congdon, George C.....'09	5 00	
Brundage, Albert H.....'08-'09-'10	15 00		Conger, Frederic A.....'10	5 00	
Bryson, William S.....'09	5 00		Conn, Moise C.....'09	5 00	
Buckner, John C.....'08-'09	10 00		Connelly, Fred W.....'09	5 00	
Amount carried forward.....	\$1225 00	\$6 00	Amount carried forward.....	\$1665 00	\$15 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward	\$1665 00	\$16 00	Amount brought forward	\$2260 00	\$22 00
Conover, Samuel H. '09	5 00		Deck, Lewis C. '10	5 00	
Counyngnam, William B. '10	5 00		Decker, W. Robert. '09	5 00	
Conzet, Rufus W. '10	5 00		Dedman, Richard S. '09	5 00	
Cooban, Benj. S. '10	5 00		Deener, Richard S. '09	5 00	3 00
Coody, A. Stimson. '09	5 00		Deibert, Thomas I. '10	5 00	
Cook, Alfred P. '09-'10	10 00		Delaney, Thomas F. '10	5 00	
Cook, E. Fullerton. '10	5 00		Denek, J. F. '10	5 00	
Cook, Moses. '10	5 00		Depeyre, Louis N. '09	5 00	
Cook, Parker. '10	5 00		Desha, L. J. '10	5 00	
Cook, Thomas P. '10	5 00		Dewender, Wm. H. '10	5 00	
Coonley, Charles. '10	5 00		Dewey, Albert H. '09-'10	10 00	
Coons, William J. '09	5 00		Dexheimer, B. A. '10	5 00	
Coontz, Floyd. '09	5 00		Di Trapani, Anthony. '09	5 00	
Cooper, James E. '09	5 00		Diamond, Peter. '07-'08	10 00	
Cooper, James W. '10	5 00		Diaz, José G. '10	5 00	
Cooper, Zada M. (Miss). '09-'10	10 00		Dickhut, L. A. '10	5 00	
Cornick, John W. '07-'08-'09	15 00	3 00	Dickinson, William R. '09-'10	10 00	
Cornell, Edward A. '09	5 00		Dickson, Fred. W. '09	5 00	
Correll, Eugene P. '09	5 00		Dieden, Frank X. '07-'08	10 00	
Cosby, Chas. R. '09-'10	10 00		Diehl, August. '10	5 00	
Côté, André A. '08	5 00		Diekman, George C. '10	5 00	
Cotton, Robert M. '09	5 00		Diggs, Lowell C. '09	5 00	
Coughlin, John. '10	5 00		Dillenback, Carrett V. d. V. '08	5 00	
Coulson, Jack. '09	5 00		Dilly, Oscar C. '09	5 00	
Coulson, James T. '10	5 00		Dimmitt, Addison. '09	5 00	
Cousins, Walter H. '10	5 00	3 00	Dimond, Harry J. '10	5 00	
Coussens, Bettie P. '10	5 00		Diner, Jacob. '09	5 00	5 00
Covey, John W. '10	5 00		Dinkler, Frank A. '10	5 00	
Craighill, Edward A. '09-'10	10 00		Dissoaway, Thurston N. '09-'10	10 00	
Craine, Percy P. '09	5 00		Dittmeyer, Walter E. '10	5 00	
Cramer, Max. '09	5 00		Dixon, J. Marion. '10	5 00	
Crampton, Ferd. L. '09	5 00		Dodge, F. D. '10	5 00	
Craw, Eugene E. '09	5 00		Dodds, Richard N. '09	5 00	
Crawford, Joseph. '07	5 00		Dodge, Murray M. '09	5 00	
Creighton, Mary L. (Miss). '10	5 00		Dohme, Alfred R. L. '10	5 00	
Crolley, Theodore A. '09	5 00		Donahue, Henry M. '09	5 00	
Cross, Elias H. '10	5 00		Doolittle, Roscoe E. '09	5 00	
Crowley, Jas. T. '09	5 00		Dort, Edward H. '10	5 00	
Cryster, Ralph. '09-'10	10 00		Dougherty, Edwin R. '09	5 00	
Cuervo, Adolfo. '08-'09	10 00		Dow, John P. '09	5 00	
Culbreth, David M. R. '09-'10	10 00		Dowdy, Joseph F. '09	5 00	
Culley, John. '09-'10	10 00		Downes, Edwin R. '08-'09	10 00	
Culpepper, Thomas J. '07-'08-'09	15 00		Drackett, Philip W. '09	5 00	
Curd, Thomas N. '10	5 00		Doyle, Joseph J. '09	5 00	
Curqueo, Antonio G. '09-'10	10 00		Dresser, George E. '08-'09	10 00	
Curry, David W. '09	5 00		Drossel, August A. '09	5 00	
Cuthbert, Richard W. '10	5 00		Druehl, Amanda S. (Mrs.). '08	5 00	
Czyzewski, Blasius J. '09-'10	10 00		Dubois, William L. '10	5 00	
Daboll, Horace H. '09-'10	10 00		Dubrule, Rosaire. '10	5 00	
Dadd, Robert M. '09-'10	10 00		Duering, Henry C. '09	5 00	
Dahlin, Horace O. '09	5 00		Duncan, Chester A. '07-'08-'09	15 00	
Danek, John F. '09-'10	10 00		Duncan, William D. '09-'10	10 00	
Daneker, Howard N. '09	5 00		Dunning, H. A. Brown. '10	5 00	
Darling, Joshua F. '09	5 00		Dunning, Lyman T. '09	5 00	
Dannemann, Edward. '09	5 00		Dvorak, Joseph T. '09	5 00	
Darbaker, L. K. '09-'10	10 00		Dye, Clair A. '10	5 00	
Dare, Charles F. '09-'10	10 00		Dyna, Carl F. '09	5 00	
Davies, Llewellyn P. '09-'10	10 00		Earhart, Fred. A. '07-'08	10 00	
Davis, Charles H. '09	5 00		Easterday, Herbert C. '10	5 00	
Davis, Charles H. '08	5 00		Ebbs, John B. '09	5 00	
Davis, Charles L. '10	5 00		Eberhardt, Ernest G. '09-'10	10 00	
Davis, Daniel F. '09	5 00		Eberle, Arthur R. '10	5 00	
Davis, Emma M. (Miss). '09	5 00		Eberle, Eugene G. '10	5 00	
Davis, Eugene M. '09	5 00		Eberle, Herman T. '10	5 00	
Davis, John A. '07	5 00		Eccles, Robert G. '10	5 00	
Davis, Peter B. '09-'10	10 00		Eckler, Charles R. '09	5 00	
Dawson, Byron F. '09-'10	10 00		Eddy, Wynn L. '09-'10	10 00	
Dawson, John H. '09	5 00		Ehrlicher, Henry M. '09	5 00	
Dayton, Walter H. '09-'10	10 00		Eichold, Bernard H. '09	5 00	
De Jonge, Cornelius. '09	5 00		Elfsstrand, Wilhelm. '09	5 00	
De Jongh, Pedro. '08-'09	10 00		Elie, Leo. '10	5 00	
De Lorenzi, Albert. '09-'10	10 00		Elkio, William S. '09-'10	10 00	
De Reeves, Antonio E. '09	5 00		Emanuel, Louis, Jr. '09	5 00	
Deakynne, Harry H. '10	5 00		Emersou, Herbert W. '09	5 00	
Dean, H. G. '09	5 00		Engelhardt, Herman. '09	5 00	
Amount carried forward	\$2160 00	\$22 00	Amount carried forward	\$2610 00	\$30 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward	\$2610 00	\$30 00	Amount brought forward	\$3035 00	\$30 00
England, Joseph W.	10 5 00		Gano, William H.	10 5 00	
Engstrom, Ernst O.	10 5 00		Garber, Elmer F. W.	10 5 00	
Erkel, Arthur G.	10 5 00		Garrett, Oscar N.	10 5 00	
Erickson, William A.	09 5 00		Garver, Christian '07-'08	10 5 00	
Erskine, George W.	09 5 00		Garvey, James A.	09 5 00	
Eschmann, Clemens L.	09 5 00		Gathercoal, Edmund N. '08	10 5 00	
Evans, George B.	10 5 00		Geisler, Joseph F.	10 5 00	
Evans, Wm. J.	09 5 00		Gering, Henry R.	09 5 00	
Everitt, Miles E.	09 5 00		Gertler, John H.	09 5 00	
Evers, Robert L.	09 5 00		Geisner, Emil A.	09 5 00	
Fahrner, Alphonse A.	09 5 00		Gibson, Frank L.	10 5 00	
Fairbanks, George E. B.	09 5 00		Gibson, John S.	09 5 00	
Fairchild, Benjamin T.	10 5 00		Gidley, Wm. F. '08-'09	10 5 00	
Fairchild, Samuel W.	10 5 00		Gietner, Charles '09-'10	10 5 00	
Fairchild, William F.	09 5 00		Gilman, Elbridge W.	10 5 00	
Falk, John C.	10 5 00		Gilpin, Henry B.	10 5 00	
Fantus, Bernard	10 5 00		Githens, Thomas S.	09 5 00	
Faxon, Henry D.	10 5 00		Gleason, Patrick S. '09-'10	10 5 00	
Fearis, Burvadis W.	09 5 00		Gleghorn, James S. '08-'09	10 5 00	
Feick, Charles	09 5 00		Gleissner, B. N.	10 5 00	
Feidt, George D. '07-'08	10 5 00		Glenn, Oliver Z.	09 5 00	
Feil, Joseph	09 5 00		Glover, Ethridge E.	09 5 00	
Fein, Mary A. (Miss)	09 5 00		Glover, William H.	09 5 00	
Fenger, F.	10 5 00		Godbold, Fabius C.	10 5 00	
Fennel, Charles T. P.	09 5 00		Godding, John G.	10 5 00	
Ferguson, George A.	09 5 00		Goeckel, Henry J.	09 5 00	
Fickardt, Fred. L.	09 5 00		Goldsborough, Charles H.	09 5 00	
Fieber, Gustavus A.	09 5 00		Goodhart, Brus C.	09 5 00	
Fink, Daniel J.	10 5 00		Goodrich, George H.	09 5 00	
Finneran, James F.	10 5 00		Goodsell, Willard R.	09 5 00	
Finninger, Paul E.	09 5 00		Gordin, Harry M.	10 5 00	
Fischer, Albert '07-'08	15 00		Graber, Howard T.	10 5 00	
Fischer, A. J.	10 5 00		Grace, William D. '09-'10	10 5 00	
Fischer, Henry J.	10 5 00		Gradon, Walter A.	09 5 00	
Fisher, George W.	10 5 00		Grasser, John J.	09 5 00	
Fleet, Chas. B.	09 5 00		Grassly, Charles W. '08-'09-'10	15 00	
Flemer, Lewis	10 5 00		Gratton, George F.	09 5 00	
Flint, John H.	09 5 00		Grauer, Norman A.	09 5 00	
Flint, William S. '09	10 00		Graves, John C.	10 5 00	
Flowers, Hiland	09 5 00		Gray, Margaret McC. (Mrs.) ..	09 5 00	
Fogas, William H.	09 5 00		Grazer, Fred. A. '07	09 5 00	
Forbes, J. Winchell	09 5 00		Green, Benjamin	10 5 00	
Ford, L. T.	10 5 00		Green, Edward T.	09 5 00	
Ford, R. E.	10 5 00		Green, Franklin T.	09 5 00	
Forsyth, William K.	07 5 00		Green, Robert L. '09-'10	10 5 00	
Foster, John B.	09 5 00		Green, Robert M.	09 5 00	
Foucek, Chas. G.	09 5 00		Green, Walter L.	09 5 00	
Fouch, Wm. M.	10 5 00		Greenawalt, William G.	09 5 00	
Fox, Willard M.	09 5 00		Gregorious, George '08-'09	10 5 00	
Frailey, William O.	10 5 00		Gregory, Willis G.	09 5 00	
Frames, J. Fuller	09 5 00		Greule, Albert M.	10 5 00	
Francis, John M. '09-'10	10 00		Grewe, Louis F.	09 5 00	
Francis, J. Richard	09 5 00		Griffin, Lyman W.	10 5 00	
Frank, Adolph	10 00		Griffin, Truman '09-'10	10 00	
Frater, George	09-'10	10 00	Griffith, Chas.	09 5 00	
Frauenhoff, Frederick L.	10 5 00		Grohman, Edward J. C.	09 5 00	
Frazier, William J. '09-'10	10 00		Gross, William O.	09 5 00	
Freericks, Frank H. '08-'09	10 00		Groves, Henry C.	09 5 00	
French, Harry B.	10 5 00		Gruen, J. George	09 5 00	
French, Howard B.	10 5 00		Guerin, James F.	09 5 00	
Fricke, Chas. B. '09-'10	10 00		Guest, Wilbert H.	09 5 00	
Fricke, Frederick G.	10 5 00		Guidry, Ambrose J.	09 5 00	
Fricke, Frederick H.	10 5 00		Haack, Ludolph G. '09-'10	10 00	
Frutchey, George W.	09 5 00		Haddad, Saleem F.	09 5 00	
Fry, Herman	10 5 00		Haeseler, Loren M. '07-'08-'09	15 00	
Fry, Narcys G.	10 5 00		Hagans, Daniel A. '09-'10	10 00	
Frye, Geo. C.	10 5 00		Hagee, William P.	09 5 00	
Gabell, Cromwell P.	09 5 00		Hagemann, W. H.	10 5 00	
Gaddess, John	09 5 00		Hahman, Paul T.	09 5 00	
Gaddess, Thomas	09 5 00		Hahn, Charles W. J. H.	09 5 00	
Gaesser, Theobald T.	09 5 00		Hain, Frank W. A.	10 5 00	
Gahn, Henry	09 5 00		Hale, W. W.	10 5 00	
Gallenkamp, Edward W.	09 5 00		Hall, Frank M.	09 5 00	
Gammon, Irving P.	09 5 00		Hall, Joseph P. '09-'10	10 00	
Gane, Eustace H.	10 5 00		Hall, William A.	09 5 00	
Amount carried forward	\$3035 00	\$30 00	Amount carried forward	\$3495 00	\$25 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$3495 00	\$35 00	Amount brought forward.....	\$3970 00	\$35 00
Hallaway, Robert R.....'09-10	10 00		Hodges, Jesse D.....'09-10	10 00	
Hallberg, Carl S. N.....'09	5 00		Hodgson, Joseph A.....'09	5 00	
Hallenberg, Oscar.....'09	5 00		Hodson, Eugene W.....'09-10	10 00	
Halstead, Alice L. (Mrs.).....'10	5 00		Hoffelt, Edw.....'10	5 00	
Hamann, William A.....'10	5 00		Hoffmann, George F.....'09	5 00	
Hammar, Alrick.....'10	5 00		Hohman, Geo.....'10	5 00	
Hamner, Edward C.....'10	5 00		Holliday, Francis E.....'10	5 00	
Hance, Anthony M.....'00	5 00		Holloway, Jesse D.....'09	5 00	
Hancock, James E.....'10	5 00		Holmes, Henry E.....'10	5 00	
Hankey, William T.....'10	5 00		Holsopple, J. Bert.....'09-10	10 00	
Hannan, Owen B.....'08-09	10 00		Holzhauser, Charles W.....'10	5 00	
Harbaugh, Wilson L.....'10	5 00		Hoover, George W.....'09	5 00	
Hardin, John H.....'09-10	10 00		Hope, Robert L.....'09	5 00	
Harman, Harry M.....'09	5 00		Hopkins, Jesse L.....'10	5 00	
Harms, Herman.....'10	5 00		Hopp, Lewis C.....'09	5 00	
Harrah, J. W.....'10	5 00		Horlick, Alex J.....'10	5 00	
Harrington, Michael T., Jr.....'09-10	10 00		Horn, Wilbur F.....'09	5 00	
Harrison, Robert L.....'08-10	10 00		Horne, Warren W.....'09	5 00	
Harter, Isaac F.....'09	5 00		Horton, Charles H.....'08-09	10 00	
Hartigan, Joseph D.....'09	5 00		Horwitz, Leon.....'09	5 00	
Harting, Rudolph R.....'09	5 00		Houck, David L.....'10	5 00	
Hartwig, Otto J.....'09	5 00		Houghton, E. Mark.....'09-10	10 00	
Hartz, J. D. August.....'10	5 00		Hoyer, William A.....'10	5 00	
Hartz, William T.....'09-10	10 00		Howard, Fletcher (Mrs.).....'09	5 00	
Hassinger, Samuel E. R.....'10	5 00		Howard, Henry.....'09	5 00	
Hatcher, Robert A.....'10	5 00		Howell, Edward V.....'09	5 00	
Hatton, Ellmore W.....'10	5 00		Howson, Arthur B.....'10	5 00	
Hauenstein, William.....'09	5 00		Hubbard, Fred. A.....'10	5 00	
Haussamen, Henry L.....'09	5 00		Huder, Henry J.....'10	5 00	
Haussmann, Frederick W.....'09	5 00		Hudnut, Richard A.....'10	5 00	
Hay, Chas. L.....'08-09	10 00		Huegel, Henry O. A.....'09	5 00	
Hay, Edward A.....'09-10	10 00		Huested, Alfred B.....'09	5 00	
Hayes, Horace P.....'09	5 00		Hughes, James A.....'09	5 00	
Haymaker, Frank B.....'09	5 00		Huhn, Charles H.....'09	5 00	
Haynes, Herbert.....'10	5 00		Hummel, John A.....'09-10	10 00	
Hays, Francis B.....'10	5 00		Hund, G. B.....'10	5 00	
Heaton, John C.....'10	5 00		Hunsberger, Ambrose.....'09	5 00	
Heberd, Edward S.....'09	5 00		Hunt, Reid.....'09-10	10 00	
Hechler, Edward H.....'07-08-09	15 00		Hunter, Sylvester W.....'09	5 00	
Heebner, Charles F.....'10	5 00		Hurd, John C.....'10	5 00	
Heitton, Wallace M.....'09	5 00		Hurlbert, William A.....'09-10	10 00	
Heidbreder, Albert H.....'10	5 00		Hurlbaus, George W.....'09-10	10 00	
Heilman, Belle C. (Miss).....'09-10	10 00		Hurley, Horace O.....'10	5 00	
Heim, Henry.....'07-08	10 00		Hurley, John.....'10	5 00	
Heinemann, Albert F.....'10	5 00		Hurty, John N.....'10	5 00	
Heilmann, Joseph.....'10	5 00		Hutton, M. E.....'10	5 00	
Heller, Charles T.....'09-10	10 00		Hyde, Joseph B., Jr.....'09-10	10 00	
Heilmuth, Joseph A.....'10	5 00		Hynson, Henry P.....'10	5 00	
Hemm, Francis.....'09	5 00		Ilhardt, William K.....'09	5 00	
Hengst, J. Edwin.....'09	5 00		Isakovics, Alois von.....'10	5 00	
Henkel, Alice (Miss).....'09-10	10 00		Ittner, William F.....'09	5 00	
Henkel, Charles B.....'09	5 00		Jackman, Wilbur F.....'09	5 00	
Henning, Adolph.....'09-10	10 00		Jackson, Frank A.....'08-09	10 00	
Henry, Frank C.....'09	5 00		Jackson, Hugh C.....'09	5 00	
Hepburn, John.....'09	5 00		Jacobs, Charles C.....'09-10	10 00	
Herbert, William P.....'09	5 00		Jacobson, William F.....'09	5 00	
Hermanek, Joseph C.....'10	5 00		Jamieson, George A.....'09	5 00	
Herrera, Francisco.....'08-09	10 00		Jehlik, Anton J.....'09	5 00	
Herty, Frank J.....'08-09	10 00		Jelinek, John P.....'08-09	15 00	
Hess, Nicholas A.....'09	5 00		Jensen, Gerhard H.....'07-08-09	15 00	
Hess, Paul L.....'09	5 00		Jensen, Peder.....'09	5 00	
Hicks, J. E. T.....'10	5 00		Joergensen, Sophus.....'09	5 00	
Hickerson, William H.....'09-10	10 00		Jo hann, Adam E.....'10	5 00	
Hickox, Milton.....'09	5 00		John, M. J.....'10	5 00	
Highfield, Herbert M.....'09	5 00		Johnson, Edward F.....'09-10	10 00	
Hilpert, Willis S.....'10	5 00		Johnson, Lewis.....'09	5 00	
Hindes, J. F.....'10	5 00		Johnson, Manuel.....'10	5 00	
Hindle, William P.....'10	5 00		Johnson, Ralph H.....'08	5 00	
Hindman, F.....'10	5 00		Jones, A. M.....'10	5 00	3 00
Hires, Lewis Moore.....'08-09	10 00		Jones, David F.....'09-10	10 00	
Hitchcock, George H.....'09	5 00		Jones, Edward B.....'09-10	10 00	
Hitchcock, John E.....'09-10	10 00		Jongejan, C. H.....'10	5 00	
Hoburg, William A., Jr.....'10	5 00		Jorgenson, Edward B.....'09	5 00	
Hoch, Aquila.....'09	5 00		Josenhans, Reinhardt C. J.....'09-10	10 00	
Hoch, Quintus.....'09	5 00		Judge, Charles R.....'09	5 00	
Amount carried forward.....	\$3970 00	\$35 00	Amount carried forward.....	\$4445 00	\$38 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$4445 00	238 00	Amount brought forward.....	\$4890 00	\$44 00
Judson, Arthur F.....'09	5 00		Krul, John G.....'09	5 00	
Kaczowski, Adolph O.....'09	5 00		Krivavica, Antony.....'10	5 00	
Kahn, Solomon K.....'09	5 00		Kuehne, Charles.....'09	5 00	
Kalish, Oscar G.....'10	5 00		Kuhn, D. J.....'10	5 00	
Kalusowski, Henry E.....'10	5 00		Kulp, G. H.....'10	5 00	5 00
Kantrowitz, Hugo.....'09	5 00		Kurtz, Irving W.....'08-'09	10 00	
Kaplansky, David.....'09	5 00		Kurtz, William B.....'09	5 00	
Kassulke, August.....'09	5 00		Kutchbauch, John F.....'10	5 00	
Katz, Gus.....'09	5 00		Kutscher, George W.....'09	5 00	
Katz, Otto.....'09	5 00		Kuykendall, William A.....'09	5 00	
Kaufman, Reuben M.....'09-'10	10 00		Laack, Adolph G.....'09	5 00	
Kauffman, Emmett C.....'09	5 00		LaPierre, Elie H.....'10	5 00	
Kearfott, Clarence P.....'10	5 00		LaWall, Charles H.....'10	5 00	
Kebler, Lyman F.....'09	5 00		LaWall, Millicent R. (Mrs.).....'10	5 00	
Keemer, Edgar B.....'08-'09	10 00		Lacey, William H.....'09	5 00	
Keith, Irwin A.....'10	5 00		Lackenbach, Fred. I.....'08	5 00	
Keller, Alfred J.....'09	5 00		Lackey, Richard H.....'10	5 00	
Keller, Chas F., Jr.....'09	5 00		Ladakis, Triantaphyllo.....'09	5 00	
Keller, William O. E.....'09	5 00		Lalor, James H.....'10	5 00	
Kelley, Chas. S.....'09	5 00		Lamar, William R.....'09	5 00	
Kelley, E. Frank.....'09-'10	10 00		Lamb, John A.....'09-'10	10 00	
Kemp, Edward.....'10	5 00		Landon, Ray L.....'09	5 00	
Kenny, T. J.....'10	5 00		Lane, John J.....'09-'10	10 00	3 00
Kent, Nich. G.....'09-'10	10 00		Lang, George Jr.....'09-'10	10 00	
Kephart, Philip.....'08-'09	10 00		Langenhan, H. Aug.....'09	5 00	
Kercher, Edwin H.....'10	5 00		Larsen, Lars P.....'10	5 00	
Ketchum, James S.....'09	5 00		Larson, Martin.....'10	5 00	
Kettler, Edward, Jr.....'09	5 00		Lascoff, J. Leon.....'09-'10	10 00	
Kiedaisch, George A.....'09-'10	10 00		Latham, Thomas.....'10	5 00	
Kiesling, A. E.....'10	5 00		Laue, John M. A.....'10	5 00	
Kiler, Abdel W.....'09-'10	10 00		Laurin, Theodore F.....'09	5 00	
Killen, Daniel J.....'09	5 00		Laux, Carl.....'09	5 00	
Kimberlin, Ernest M.....'09	5 00		Le Richeux, Alfred C.....'09	5 00	
Kimberly, Chas. H.....'10	5 00		Leavitt, Adoniram J.....'10	5 00	
King, George A. N.....'09	5 00		Leber, J. Gilbert.....'09	5 00	
Kingman, Ignatius.....'07	5 00		Lee, Irma U. Miss.....'09-'10	10 00	
Kirby, Chas. P.....'09	5 00		Lee, J. V.....'10	5 00	5 00
Kirchgasser, William C.....'10	5 00		Lee, Richard H.....'09	5 00	
Kirchgassner, William C.....'09	5 00		Lee, William E.....'10	5 00	
Kirk, Frank H.....'09-'10	10 00		Leeb, Theodore F.....'09	5 00	
Kisker, Frederick W.....'09	5 00		Leet, Robt. A.....'09	10 00	
Klein, Edward N. E.....'10	5 00		Legel, John G.....'09	5 00	
Klein, Ernest F.....'10	5 00		Legendre, Joseph A.....'09	5 00	
Klenert, F. A.....'10	5 00		Lehman, Louis.....'08-'09	10 00	
Klenze, William T.....'10	5 00		Lehman, R. S.....'10	5 00	
Klie, G. H. Charles.....'09	5 00		Lehr, Philip.....'09	5 00	
Kliemand, Geo.....'09	5 00		Lemasters, William O.....'10	5 00	
Kline, Clarence M.....'10	5 00		Lengfeld, Joseph L.....'09-'10	10 00	
Klore, William W.....'09	5 00		Leonard, Edward F.....'10	5 00	
Knabe, Gustavus A.....'09	5 00		Leverly, John A.....'09	5 00	
Knight, Frank H.....'10	5 00		Lewer, Oscar H.....'09	5 00	
Kniseley, Herman D.....'08-'09	10 00		Lewis, George.....'09	5 00	
Knoebel, Percy T.....'10	5 00		Lewis, George A.....'09-'10	10 00	
Knoebel, Thomas.....'10	5 00		Lewis, Henry.....'10	5 00	
Knoefel, Bruno.....'09	5 00		Lichthardt, George H. P.....'09	5 00	
Knoepfel, William H.....'09-'10	10 00		Lieberstein, Louis.....'09	5 00	
Knowlton, George H.....'09	5 00	3 00	Lillie, Forest B.....'09	5 00	
Knox, James W. T.....'09-'10	10 00		Lilly, Josiah K.....'10	5 00	
Knox, Robert J.....'09	5 00	3 00	Lindly, John M.....'09	5 00	
Knox, S. D.....'09	5 00		Lindvall, Gus.....'10	5 00	
Koch, Julius A.....'09-'10	10 00		Linton, A. W.....'10	5 00	
Koch, William J.....'10	5 00		Livengood, Daniel W.....'09	5 00	
Koegel, Herman H.....'09	5 00		Llewellyn, Frederick W.....'09-'10	10 00	
Koehler, William F.....'09	5 00		Lobenhoffer, Philip.....'09	5 00	
Koelle, Otto C.....'09	5 00		Loehr, Theodore C.....'09	5 00	
Koepfen, Albert C.....'09	5 00		Loertz, Carl E.....'09-'10	10 00	
Koerth, E. C.....'10	5 00		Loesser, Paul A.....'07	5 00	
Koester, H.....'10	5 00		Lohmann, John.....'10	5 00	
Koss, Frank.....'09	5 00		Long, John N. G.....'09	5 00	
Kossler, Herman S.....'09	5 00		Lordier, Charles J.....'08-'09	10 00	
Kreizinger, Karl L.....'10	5 00		Loreux, John S.....'07-'08	10 00	
Kress, S.....'08-'09	10 00		Lough, Thomas W.....'09	5 00	5 00
Kretz, Edward J.....'09-'10	10 00		Lovis, Henry C.....'10	5 00	
Krieg, A.....'10	5 00		Lowe, Clement B.....'09	5 00	
Krieger, John C.....'09	5 00		Lowry, Wm. J., Jr.....'08-'09-'10	15 00	
Amount carried forward.....	\$4890 00	\$44 00	Amount carried forward.....	\$5345 00	\$40 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward . . .	\$3345 00	\$62 00	Amount brought forward . . .	\$5790 00	\$67 00
Lowthian, John P.	5 00		McQuillen, Francis	5 00	
Lucas, George R.	5 00		McVay, Ernest Avery	5 00	
Ludwig, Wm. E.	5 00		Mehl, Henry W.	5 00	
Lueder, John T.	10 00		Meier, Arthur J.	5 00	
Lyford, Earl H.	5 00		Meissner, Frederick W., Jr.	5 00	
Lyman, Rufus A.	5 00		Meixner, Fred. M. F.	5 00	
Lynn, Charles J.	5 00		Meredith, C. R.	5 00	
Lyon, Arthur G.	5 00		Meredith, H. Lionel	10 00	
Lyons, Lucien E.	10 00		Merrell, George R.	5 00	
Maddowell, Wm. F.	5 00		Merrell, Hubert S.	5 00	
Machenheimer, Don G.	10 00		Merrell, H. S. Jr.	5 00	
Macy, Sherman R.	5 00		Mertz, Edw. L.	10 00	
Maggio, James L.	5 00		Meserve, Albert W.	5 00	
Maguire, Edward S.	10 00		Metz, Abraham L.	5 00	
Maisch, Henry	5 00		Metzger, Arthur S.	10 00	
Maisel, Joseph	5 00		Metzger, Matthias C.	10 00	
Major, John R.	5 00		Meyer, Adolph C.	5 00	
Mallard, Albert E.	5 00		Meyer, Charles L.	10 00	
Mann, Charles F.	10 00		Meyer, Frederick H.	5 00	
Mansfield, Samuel	5 00		Meyer, Theodore F.	5 00	
Mansfield, William	5 00		Michels, John B.	10 00	
Mares, Ferdinand L.	5 00		Mierzwa, Richard	5 00	
Marion, Etienne J.	10 00		Mikkelsen, Niels	10 00	
Markowitz, Abe	5 00		Millard, David R.	5 00	
Marr, William G.	10 00		Millener, William S.	5 00	
Marsh, Josiah	5 00		Miller, Albert	5 00	
Martin, A. J.	5 00		Miller, Charles	5 00	
Martin, Harry	5 00		Miller, Chas. E.	5 00	
Martin, James H.	5 00		Miller, Emerson R.	10 00	
Martin, Nicholas H.	5 00		Miller, Frederick J.	5 00	
Mason, Harry B.	10 00		Miller, F. William	5 00	
Mason, Myron R.	5 00		Miller, Roshier W.	10 00	
Mathison, Soren	5 00		Miller, T. Ashby	10 00	
Matusow, Harry	5 00		Mills, Geo. P.	5 00	
Mauldin, J. M. H.	5 00		Minehart, John R.	5 00	
Maurer, Henry C.	5 00		Miner, Maurice A.	5 00	
Maxwell, Hazel (Miss)	5 00		Minesinger, Norman W.	5 00	
May, Charles C.	5 00		Minor, Harry S.	5 00	
May, Louis	5 00		Missildine, E. E.	5 00	5 00
Mayer, Joseph L.	5 00		Mittermiller, John A.	5 00	
Mayer, Peter	5 00		Mittelbach, William	5 00	
Mayes, Joseph A.	5 00		Mohler, David C.	5 00	
Mayo, Caswell A.	5 00		Mollett, Chas. E. F.	5 00	
Mayo, Frederick W.	5 00		Moore, Ida L. (Miss)	5 00	
McAdams, William J.	5 00		Moore, John T.	5 00	
McArthur, Jas. W.	5 00		Moore, Silas H.	10 00	
McBride, James G.	10 00		Moore, S. W.	5 00	
McCartney, Frank L.	5 00		Moore, Thomas H.	5 00	
McCauley, Charles E.	5 00		Morales, C. Garcia	5 00	
McClugage, John J.	10 00		Morgan, Aylmer L.	5 00	
McClure, Clarence M.	5 00		Morgan, Charles	10 00	
McConaughy, Thomas S.	5 00		Morgan, George S.	5 00	5 00
McConnell, Chas. H.	5 00		Morland, Robert L.	10 00	
McConnell, Lewis W.	5 00		Morris, Max	10 00	
McConomy, Paul L.	5 00		Morrison, George S.	10 00	
McCormick, Peter J.	5 00		Morse, Edward W.	10 00	
McDiarmid, Daniel P.	10 00		Mosher, William W.	10 00	
McDonnell, Herbert L.	10 00		Motter, Murray G.	5 00	
McDuff, Geo. W.	5 00		Moya, Carlos A.	5 00	
McFerren, J. D.	5 00		Moyer, Lewis N.	10 00	
McGill, John T.	5 00		Mueller, Ambrose	5 00	
McGinnvie, J. D.	5 00		Mueller, Frank F.	10 00	
McGovern, John F.	5 00		Mueller, J. F.	5 00	
McKellips, Clarence	5 00		Mueller, J. George	5 00	
McKenzie, Robt. H.	5 00		Mueller, Otto E.	5 00	
McKesson, Donald	5 00		Muench, Wm.	5 00	
McKesson, G. Clinton	5 00		Muir, William	10 00	
McKibben, Robert G.	5 00		Mulford, Henry K.	5 00	
McKown, Joseph O.	5 00		Munson, James C.	5 00	
McMahon, Joseph	10 00		Murphey, E. G.	10 00	
McMillan, Daniel N.	10 00	5 00	Murray, Benjamin L.	5 00	
McNair, John Sydenham	5 00		Musselman, Claude J.	5 00	
McNeil, Robert	5 00		Muth, George G.	5 00	
McNess, Frederick W.	5 00		Muth, John C.	5 00	
McNulty, James C.	5 00		Myers, Carvosso O.	5 00	
Amount carried forward	\$5790 00	\$67 00	Amount carried forward	\$6270 00	\$77 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$6270 00	\$77 00	Amount brought forward.....	\$6705 00	\$85 00
Myers, Charles J.....	5 00		Pierce, Fred S.....	5 00	
Myers, George B.....	5 00		Pierce, Olive B. (Miss).....	10 00	
Myers, Preston B.....	10 00		Pierce, William H.....	5 00	
Nance, Oscar J.....	5 00		Pietkiewicz, Wladyslaw L.....	5 00	
Neal, Charles C.....	5 00		Pile, Gustavus.....	5 00	
Needham, Robert H.....	5 00		Plaut, Albert.....	10 00	
Neil, Dallas H.....	5 00		Plenge, Henry.....	5 00	
Nelden, Ralph.....	5 00		Plough, William H.....	5 00	
Nelligar, Frederick D.....	5 00		Plummer, Rass M.....	5 00	
Nelson, Burt E.....	5 00		Poehner, Adolf A.....	5 00	
Nelson, Edwin H.....	10 00		Poley, Warren H.....	5 00	
Nester, Herman A.....	5 00		Pollard, August T.....	10 00	
Neu, D. Alfred.....	10 00		Porr, Wm. H.....	5 00	
Neubauer, C. G.....	5 00		Porter, G. Ellis.....	5 00	
Newcomb, Edwin L.....	5 00		Porter, Martin L.....	5 00	
Newton, Robert A.....	5 00		Posey, Henry G.....	5 00	
Niece, Frederick E.....	5 00		Porterfield, William P.....	10 00	
Niederer, Albert.....	5 00		Potter, H. E.....	5 00	
Nielson, John.....	5 00		Potter, Maynard H.....	5 00	
Nitardy, Ferdinand W.....	5 00		Potts, Thomas H.....	5 00	
Nitzsche, John C.....	10 00		Powell, William C.....	5 00	
Noll, Martin J.....	5 00		Pozzi, Frank C.....	5 00	
Norton, George E.....	5 00		Prall, Delbert E.....	10 00	
Noyes, Chas. R.....	10 00		Price, W. C.....	5 00	
O'Gorman, Theophilus V.....	5 00		Prigmore, George D.....	5 00	
O'Neil, Henry M.....	5 00		Pritchard, Benjamin E.....	5 00	
Ogier, William R.....	5 00		Puckner, William A.....	5 00	
Oglesby, George D.....	5 00		Puhl, Richard H.....	5 00	
Ohl, J. D.....	5 00	3 00	Pully, L. S.....	5 00	
Ohliger, Willard.....	5 00		Pulse, John J.....	5 00	
Oldberg, Oscar.....	5 00		Quackinbush, Benjamin F.....	5 00	
Oliver, William M.....	5 00		Quandt, Ernest E.....	5 00	
Ormsby, Herbert.....	5 00		Rabak, Frank.....	5 00	
Osborne, Melmoth M.....	5 00		Raeuber, Edward G.....	5 00	
Osseward, Cornelius.....	5 00		Rafter, Michael.....	5 00	
Osterlund, Otto W.....	5 00		Ramage, Robert C.....	10 00	
Ostrosky, F. J.....	5 00	5 00	Ramsaur, David W.....	10 00	
Ottinger, James J.....	5 00		Randall, Frank O.....	5 00	
Otto, Theodore G. E.....	5 00		Rapelye, Charles A.....	10 00	
Overbeck, Bernard H., Jr.....	5 00		Rascoe, Roy.....	5 00	
Overstreet, Wm. P.....	5 00		Raubenheimer, Otto.....	10 00	
Overton, Burr M.....	5 00		Rauschenberg, Sidney.....	5 00	
Pachali, Theodore, Jr.....	10 00		Reed, Willoughby H.....	5 00	
Packard, C. Herbert.....	5 00		Reese, D. J.....	5 00	
Paddock, Morris V.....	5 00		Rehfuess, Chas.....	5 00	
Parisen, George W.....	10 00		Reilly, Robert C.....	5 00	
Parker, Frank H.....	5 00		Reimann, George.....	10 00	
Parker, Frederick M.....	5 00		Renfro, Harris B.....	10 00	
Parker, G. R.....	5 00		Reuter, Walter H.....	5 00	
Parker, William S.....	10 00		Reyer, Emil.....	5 00	
Partridge, Frank R.....	10 00		Rice, Thaddeus B.....	5 00	
Patch, James A.....	5 00		Ricen, Joseph M.....	5 00	
Patterson, Charles M.....	5 00		Rich, Stanley H.....	5 00	
Patterson, Charles W.....	5 00		Rich, W. Pitt.....	5 00	
Pauley, Frank C.....	10 00		Richardson, Frank.....	10 00	
Peairs, Howard A.....	5 00		Richardson, Samuel W.....	5 00	
Pearce, Howard A.....	5 00		Richmann, William O.....	5 00	
Pearre, Albert L.....	5 00		Riddell, Benjamin F.....	5 00	
Pearson, Joseph F.....	5 00		Riegel, Samuel J.....	5 00	
Pearson, Paul.....	5 00		Riemenschneider, Julius H.....	10 00	
Pearson, Wm. A.....	5 00		Riess, Adolph J.....	5 00	
Pease, Autumn V.....	5 00		Riess, Herman W.....	5 00	
Pedigo, Smith C.....	10 00		Riley, Cassius M.....	10 00	
Pegg, Harry W.....	5 00		Ring, William A.....	5 00	
Pelikan, L. J.....	5 00		Rippeto, John R.....	5 00	
Pellerrano, Nicholas A.....	5 00		Rippeto, W. B.....	5 00	
Perkins, Benjamin A.....	5 00		Roberts, J. C.....	5 00	
Peska, Alexander C.....	5 00		Robertson, Felix O.....	5 00	
Peter, Minor C.....	5 00		Robertson, William F.....	5 00	
Peters, Henry A.....	5 00		Rockefeller, Howard.....	5 00	
Petersilge, Emil.....	5 00		Rodemoyer, William E.....	5 00	
Petsche, Bismark Wm.....	5 00		Rodgers, Edward J.....	5 00	
Pettersen, Ernst W.....	5 00		Roe, J. Newton.....	10 00	
Philip, Waldemar B.....	10 00		Roe, John T.....	5 00	
Pierce, Fred.....	5 00		Roediger, Louis F.....	5 00	
Amount carried forward.....	\$6705 00	\$85 00	Amount carried forward.....	\$7155 00	\$85 00

ALPHABETICAL LIST OF PAYMENTS.

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	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward	\$755 00	\$85 00	Amount brought forward	\$7620 00	\$85 00
Roehrig, Albert M. '09-'10	10 00		Schrank, Henry C. '10	5 00	
Roemer, Frederick	5 00		Schreiber, Aug. '09	5 00	
Roenne, Paul L. '09	5 00		Schreiner, Rolert. '10	5 00	
Rogers, Edward	5 00		Schrodt, Jacob	5 00	
Rogers, Russell V. '10	5 00		Schueller, Frederick W. '10	5 00	
Rohrman, F. R. '10	5 00		Schub, Paul G. '10	5 00	
Rose, Shannon S. '09	5 00		Schultz, John J. '10	5 00	
Rosengarten, George D. '10	5 00		Schulz, Raymond L. '09	5 00	
Rosenthal, David A. '10	5 00		Schulze, Louis	5 00	
Rosenzweig, Benj. '10	5 00		Schwartz, Maurice P. '09	5 00	
Ross, Otto E. '09-'10	10 00		Schweinfurth, George E. '10	5 00	
Rothwell, Walter	5 00		Schweitzer, Joseph	10 00	
Rowles, James O	5 00		Scott, Alexander W. '09	5 00	
Rowlinski, Robert A. '09	5 00		Scott, Edgar B. '08-'09	10 00	
Rubenstein, Louis	5 00		Scott, Harry	5 00	
Rudder, William H. '09-'10	10 00		Seaman, Frederick A. '10	5 00	
Ruenzel, Henry G	5 00		Searby, Wm. M. '09	5 00	
Ruesch, Wm. E. '08-'09	10 00		Secord, G. L. '10	5 00	
Ruppe, Bernard C. '09	5 00		Seibert, George F. '10	5 00	
Rust, Schuyler S. '09	5 00		Seidell, Atherton	5 00	
Ryan, Ambrose E. '09-'10	10 00		Seil, Harvey A. '09	5 00	
Ryan, Frank G. '10	5 00		Seimsoth, John J. '09	5 00	
Ryder, Horace F. '09	5 00		Seitz, Lorenz A. '10	5 00	
Ryus, Floyd E. '09	5 00		Seltzer, Leonard A. '09	5 00	
Saalbach, Carl	5 00		Selzer, Elliott E. '09	5 00	
Saalbach, Louis	10 00		Selzer, Eugene R. '10	5 00	
Saccar, Michael	5 00		Sennewald, Emil A. '09	5 00	
Sahm, Louis N. '09-'10	10 00		Serodino, Herman	5 00	
Sala, Albert F. '09	5 00		Seydler, Rob. '10	5 00	
Samson, Max	5 00		Seyfert, Paul	10 00	
Sand, J. B. '10	5 00		Seymour, James	5 00	
Sandles, Van Amburg	5 00		Shaak, Franklin P. '10	5 00	
Sanford, John F. '09	5 00		Shafer, Erwin C. '08	5 00	
Sarra, Ernesto	5 00		Shannon, Thomas J. '09-'10	10 00	
Sass, Stephen K. '10	5 00		Sharp, Solomon A. '10	5 00	
Sauerbrun, Otto O. '09	5 00		Shaub, J. Raymond	5 00	
Sauvinet, Chas. D. '09	5 00		Sheblessy, Michael A. '09-'10	10 00	
Sawyer, Charles H. '09	5 00		Sherman, Charles R. '10	5 00	
Sawyer, Hilon H. '08	5 00		Sherrard, Charles C. '08-'09	10 00	
Sawyer, Jno. R. '09	5 00		Sherwood, Henry J. '10	5 00	
Sawyer, William F. '07-'08-'09	15 00		Shiner, Samuel M. '10	5 00	
Sayre, Edward A. '10	5 00		Shoemaker, Clayton F. '09-'10	10 00	
Sayre, Lucius E. '09-'10	10 00		Shreve, John A. '09-'10	10 00	
Shaak, Milton F. '09	5 00		Shurtlett, Wilford C. '09	5 00	
Schachleiter, Francis G. '09	5 00		Siegfried, Henry J. '09	5 00	
Schadt, Conrad	5 00		Sieker, Ferdinand A. '09	5 00	
Schaefer, Chas. H. '09-'10	10 00		Sieling, J. '09	5 00	
Schaefer, Emil A. '09-'10	10 00		Sieplein, Chas. A. '09	5 00	
Schaefer, Laura (Miss) .. '09-'10	10 00		Siess, Leo C. '10	5 00	
Schaper, Henry F. '07	5 00		Sievers, Arthur	5 00	
Scherps, Theodor I. '09	5 00		Simon, William	10 00	
Schenck, Henry	10 00		Singleton, A. G. '10	5 00	
Schenk, Fannie K. (Mrs.) .. '09	5 00		Skeels, Howard M. '09-'10	10 00	
Scherer, Andrew	5 00		Skinner, Charles H. '09-'10	10 00	
Schieffelin, William J. '09	5 00		Slade, Harry A. '10	5 00	
Schmelfenig, Charles H. '09	5 00		Slauson, John G. '09-'10	10 00	
Schimmel, Maurice S. '09	5 00		Sloss, Robert A. '10	5 00	
Schimpi, Henry W. '10	5 00		Slover, James A. '09-'10	10 00	
Schlotterbeck, Augustus G. '10	5 00		Smetana, Andy J. '09	5 00	
Schlotterbeck, Julius O. '09	5 00		Smith, B. Frank	10 00	
Schmidt, A. F. '09	5 00		Smith, Claude R. '08-'09	5 00	
Schmidt, Frederick M. '10	5 00		Smith, F. L. '10	5 00	
Schmidt, Henry	5 00		Smith, George H. '09-'10	10 00	
Schmidt, Valentine	10 00		Smith, Guy L. '09	5 00	
Schmitt, Carl	5 00		Smith, Harley E. '09	5 00	
Schnell, Harry J. '07	5 00		Smith, Joseph G. '09	5 00	
Schoenfeld, S. '10	5 00		Smith, L. Grant	5 00	
Schoenhut, Christie H. '10	5 00		Smith, R. '10	5 00	
Schoenthaler, John P. '10	5 00		Smith, Theodor	5 00	
Scholastica Sister Mary .. '08-'09	15 00		Smith, Walter V. '10	5 00	
Scholtz, Edmund L. '10	5 00		Snodgrass, Latta K. '09	5 00	
Scholz, Wm. F. '09-'10	10 00		Snow, Charles W. '10	5 00	
Scholz, Oscar K. B. '09	5 00		Snow, H. W. '09	5 00	
Schott, E. J. '10	5 00		Snow, L. M. '09	5 00	
Schramm, Fred C. '09	5 00		Snyder, William E. '10	5 00	
Amount carried forward	\$7620 00	\$85 00	Amount carried forward	\$8065 00	\$85 00

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward.....	\$8065 00	\$85 00	Amount brought forward.....	\$8530 00	\$93 00
Sohrbeck, G. Henry.....'10	5 00		Taylor, Milton M.....'10	5 00	
Sohrbeck, George W.....'10	5 00		Teeters, Wilber J.....'10	5 00	
Sollmann, Luitpold.....'09	5 00		Terrill, Willis E.....'07-'08-'09	15 00	
Sollmann, Torald.....'10	5 00		Thelander, Creston C.....'09	5 00	
Sommer, Richard, E. E.....'10	5 00		Thomas, Daniel J.....'09	5 00	
Sonnenburg, Chas. E.....'09	5 00		Thomas, Frank G.....'09	5 00	
Soper, George M.....'09-'10	10 00		Thomas, John B.....'09-'10	10 00	
Sords, Thomas V.....'09-'10	10 00		Thomas, J. B., Jr.....'10	5 00	
Southard, Frank A.....'03	5 00		Thomas, Robert, Jr.....'09-'10	10 00	
Spalding, C. G.....'10	5 00		Thomason, W. R.....'10	5 00	
Spalding, Warren A.....'10	5 00		Thompson, Albert D.....'10	5 00	
Sparks, Edgar K.....'09-'10	10 00		Thompson, Frank A.....'09	5 00	
Sparks, James M.....'00	5 00		Thompson, Jno. R.....'09	5 00	
Spater, William C.....'07-'08	10 00		Thompson, Leon A.....'09	5 00	
Speer, Charles C.....'09	5 00		Thorburn, Albert D.....'10	5 00	
Spiegel, Adolph.....'09	5 00		Thorn, Henry P.....'10	5 00	
Spire, Wm. B.....'09	5 00		Thornhill, Sewell.....'09-'10	10 00	
Spornelli, Ernest.....'09-'10	10 00		Thum, John K.....'09-'10	10 00	
Sprague, J. F.....'09	5 00		Thurston, Edwin J.....'10	5 00	
Sprague, Wesson G.....'10	5 00		Tielke, Maxwell G.....'09	5 00	
Spring, George A.....'09	5 00		Tierney, J. A.....'10	5 00	
Squibb, Charles F.....'09	5 00		Tilley, Robert B.....'09	5 00	
Stacy, Marion F.....'10	5 00		Tilton, Claude E.....'10	5 00	
Stadelmann, Harry E.....'09-'10	10 00	5 00	Timmermann, Richard H.....'03	5 00	
Staeble, Louis I.....'09	5 00		Timmons, George D.....'09	5 00	
Stahlhuth, Ernest H. W.....'09-'10	10 00		Tobey, Chas. W.....'09	5 00	
Stam, D. F.....'10	5 00		Tobriner, Isaac.....'09-'10	10 00	
Stamm, Dante M.....'07	5 00		Tocco, Orazio.....'10	5 00	5 00
Stanbarger, Morris H.....'09	5 00		Todd, Albert M.....'09-'10	10 00	
Stanford, William H.....'10	5 00		Topler, W. G.....'07-'08-'09	15 00	
Stange, Carl F.....'09	5 00		Topping, Arthur E.....'10	5 00	
Staudt, Albert J.....'09	5 00		Torbert, W. H.....'09	5 00	
Staudt, Louis C.....'09	5 00		Toulson, Milbourne A.....'09	5 00	
Stearns, William L.....'10	5 00		Trent, W. W.....'10	5 00	
Stech, Geo. O., Jr.....'09	5 00		Trout, J. H.....'09	5 00	
Stein, Edward T. N.....'09	5 00		Troxler, Constantine, Jr.....'10	5 00	
Stephan, Otto P.....'09	5 00		Truax, Charles.....'09	5 00	
Stephenson, John J.....'09	5 00		Trudoell, L. J.....'10	5 00	1 00
Stevens, Alvin B.....'09	5 00		True, Rodney H.....'09-'10	10 00	
Stevens, Edward.....'09	5 00		Truedson, Eric P.....'09	5 00	
Stevens, Frederick S.....'10	5 00		Turner, Joseph L.....'07-'08-'09	15 00	
Stewart, John W.....'09	5 00	3 00	Tuthill, Frederick P.....'09-'10	10 00	
Sufel, Albert F.....'10	5 00		Tuttle, George O.....'10	5 00	
Suer, Carl.....'09	5 00		Utch, P. Henry.....'09	5 00	
Stimson, Charlotte E. (Miss).....'09	5 00		Van Aller, Thomas S.....'09	5 00	
Stingel, J. L.....'09	5 00		Van Antwerp, James C.....'08-'09	10 00	
Stolle, Henry J.....'09-'10	10 00		Van Derweert, Robert H.....'09	5 00	
Stone, Clarence G.....'10	5 00		Van Dyke, Charles.....'09	5 00	
Storer, Charles A.....'09	5 00		Van Ness, George I.....'09	5 00	
Stout, Marion A.....'10	5 00		Van Schaak, Cornelius P.....'10	5 00	
Stover, Chas. A.....'10	5 00		Vance, W. Scott.....'09	5 00	
Strahlmann, Edward.....'09	5 00		Vanderkleed, Charles E.....'09	5 00	
Streep, Frank P.....'09-'10	10 00		Vargas, Jarge.....'09	5 00	
Strickland, Franklin N.....'08-'09	10 00		Vaughan, Harry W.....'09	5 00	
Stroup, Freeman P.....'09-'10	10 00		Vaughn, Patrick H.....'08	10 00	
Stucky, Edward W.....'10	5 00		Villers, Rene L.....'08	10 00	
Sturmer, Julius W.....'09	10 00		Voelckel, Henry G.....'09	5 00	
Stutzlen, Frank C.....'07-'08-'09	15 00		Voelker, Edwin B.....'10	5 00	
Sult, n. Frederick W.....'10	5 00		Voigt, Joseph F.....'10	5 00	
Summer, Jennie H. (Miss).....'10	5 00		Von Stein, John H.....'09	5 00	
Suppan, Leo K. A.....'09	5 00		Votteler, William.....'10	5 00	
Sutherland, George M.....'09	5 00		Vowell, Louis S.....'10	5 00	
Swann, Robert L.....'09	5 00		Vredenburg, Bruce.....'09	5 00	
Swaringen, DeWitt C.....'10	5 00		Wagner, Arthur C.....'10	5 00	
Sweet, Caldwell.....'10	5 00		Wakeman, Nellie A. (Miss).....'09	5 00	
Sweet, William H.....'09-'10	10 00		Walbrach, Arthur.....'08-'09	10 00	
Switt, C. N.....'10	5 00		Walbridge, Cyrus P.....'10	5 00	
Swoboda, Adolph.....'10	5 00		Walker, Chas. H.....'09	5 00	
Symonds, Arthur H.....'09	5 00		Walker, Elias R.....'09-'10	10 00	1 00
Taborelli, Ernest T.....'09	5 00		Walker, Joseph P.....'09	5 00	
Takamine, Jokichi.....'10	5 00		Walker, Robert.....'09	5 00	
Taquechel, Francisco.....'09	5 00		Walker, Robert H.....'09	5 00	
Taylor, Augustus C.....'09-'10	10 00		Wall, Otto A.....'08-'09	10 00	
Taylor, E. D.....'10	5 00		Wallace, John C.....'09	5 00	
Taylor, Henry L.....'08-'09-'10	15 00		Waldorf, Edw. H.....'10	5 00	
Amount carried forward.....	\$8530 00	\$93 00	Amount carried forward.....	\$9005 00	\$101 00

ALPHABETICAL LIST OF PAYMENTS.

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	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward	\$9005 00	\$101 00	Amount brought forward	\$9425 00	\$110 00
Walter, Peter G. '08-'09	10 00		Wilcox, Levi. '10	5 00	
Waltz, J. Lee. '10	5 00		Wiley, Harvey W. '10	5 00	
Ward, A. Jse. '09	5 00		Willard, Rowland. '08	5 00	
Ward, Chas. H. '10	5 00	3 00	Willenbrink, Chas. A. '09	5 00	
Waid, Enoch J. '09	5 00		Willets, Charles E. '09	5 00	
Ward, Francis W. '09	5 00		Williams, Edward. '09	5 00	
Ward, Herbert. '09	5 00		Williams, George G. '09	5 00	
Wardle, A. '10	5 00		Williams, John K. '07-'08-'09	15 00	
Ware, Charles H. '09	5 00		Williams, John L. '09-'10	10 00	3 00
Ware, Clarence W. '08-'09	10 00		Williams, Seward W. '09-'10	10 00	
Warfield, James A. '10	5 00		Williams, Walter G. '07	5 00	
Warn, William F. '10	5 00		Williamson, R. E. L. '08-'09-'10	15 00	
Warner, William R., Jr. '10	5 00		Willson, George A. '09	5 00	
Warren, Lewis E. '09	5 00		Wilson, Charles F. '09-'10	10 00	
Washburn, Homer C. '10	10 00		Wilson, Frederick H. '09-'10	10 00	
Watson, G. N. '10	5 00		Wilson, George H. '09	5 00	
Watson, G. Y. '10	5 00		Wilson, George T. '08-'09	10 00	
Watson, Herbert K. '09	5 00		Wilson, Talvus D. '09	5 00	
Watson, Joseph R. '09-'10	10 00		Wilson, William H. '09	5 00	
Watson, William, Jr. '10	5 00		Winberg, Washington W. '09	5 00	
Watters, Alexander J. '09	5 00		Wingo, Daniel M. '09	5 00	
Weaber, John A. '09-'10	10 00		Winslow, E. F. '10	5 00	
Weaver, Clarence A. '09	5 00		Winter, Carl. '10	5 00	
Webb, Edward N. '10	5 00		Winter, James H. '09	5 00	
Webber, J. Le Roy. '10	5 00		Wirthman, J. George. '08-'09	10 00	
Weber, Lion C. '10	5 00		Wirthman, Joseph C. '09	5 00	
Webster, Lloyd H. '09	5 00		Wittich, Matthew H. '09	5 00	
Weed, Nelson. '10	5 00		Woehner, Frederick A. '09	5 00	
Weicker, Theodore. '10	5 00		Wolf, Charles A. '10	5 00	
Weidemann, Geo. B. '08-'09	10 00		Wolf, J. Carlton. '10	5 00	
Weimar, Henry. '10	5 00		Wolf, Michael F. '09	5 00	
Weinstein, Abraham. '08	5 00		Wolff, Daniel O. '09	10 00	
Weinstein, Joseph. '09	5 00		Wolff, Edward H. '10	5 00	
Weiss, William P. '10	5 00		Wood, Alonzo E., Jr. '10	5 00	
Weiss, Conrad H. '07-'08-'09	20 00		Wood, Horatio C., Jr. '10	5 00	
Weiss, Emil O. '10	5 00		Wood, James P. '10	5 00	
Weller, Frank P. '10	5 00		Wood, John W. '09	5 00	
Weils, James H. '10	5 00		Woolsey, J. F. '10	5 00	
Welsh, J. B. '10	5 00		Wooten, Thomas V. '09	5 00	
Wendel, H. Edward. '09	5 00		Wooyenaka, Keizo. '10	5 00	
Wendt, William C. '09	5 00		Workman, Robert. '09	5 00	
Werkshagen, Otto. '09	5 00		Worth, Thomas R. '09	5 00	
Werner, Rudolf C. '09	5 00		Wrensch, Henry E., Jr. '10	5 00	
Werner, Wm. F. '09	5 00		Wright, Charles L. '09	5 00	
Wesner, Henry C. '08-'09	10 00		Wright, B. C. '10	5 00	
West, Benjamin F. '09	5 00		Wright, J. T. '10	5 00	
West, Charles A. '10	5 00		Wuenssch, Charles. '09	5 00	
Westhy, Savers. '09	5 00		Wulzen, D. H. '09	5 00	
Westcott, James W. '09	5 00		Wuling, Frederick J. '09	5 00	
Westfall, Paul. '09-'10	10 00		Wunderlich, Edward. '09	5 00	
Westmoreland, E. R. '10	5 00	3 00	Wurdack, John H. '09	5 00	
Wetterstrom, Theodore D. '10	5 00		Wyckoff, Elmer E. '09	5 00	
Weydell K. Albus. '07-'08-'09	15 00		Yeomans, Sidney C. '09	5 00	
Wheeler, A. Alton. '09	5 00		Young, C. C. '10	5 00	
Whielden, Charles B. '09-'10	10 00		Young, George O. '09-'10	10 00	
White, Charles H. '09-'10	10 00		Zamora, Manuel. '09-'10	10 00	
White, Joseph L. '10	5 00		Zane, Ralph R. '09-'10	10 00	
White, Robert C. '10	5 00		Zbinden, D. H. '10	5 00	
White, Robin H. '09	5 00		Zbinden, H. F. '10	5 00	
White, William R. '09	5 00		Zeamer, Harry W. '09	5 00	
Whitehead, Bowe T. '09-'10	10 00		Zeldon, Jose A. '09	5 00	6 00
Whitney, David V. '09	5 00		Zieffe, A. '10	5 00	
Whittlesev, H. H. '10	5 00	3 00	Ziegler, Howard P. '09	5 00	
Whitworth, Frank E. '09	5 00		Zimmer, Harry E. '09	5 00	
Whortoa, Carl. '09	5 00		Zinn, Charles E. '09	5 00	
Whyte, R. M. '10	5 00		Zottman, William H. '10	5 00	
Wicarius, Max J. '09	5 00		Zuenkeler, J. Ferd. '10	5 00	
Wich, H. E. '09	5 00		Zurawski, Narcys J. '09	5 00	
Amount carried forward	\$9425 00	\$110 00	Totals	\$6834 00	\$119 00

OBITUARY NOTICES.

Name.	Address.	Elected.	Born.	Died.	Preceptor.	College.
Abernethy, Maxwell James...	Jersey City, N. J.	1865.....	1835.....	January 16, 1911....		Philadelphia, C. P.
Attfield, John.....	Watford, Eng.	Hon.				
		Member				
		1871.....	1835.....	March 18, 1911....		
Bauer, Louis G.....	Philadelphia, Pa.	1867.....	1814.....	— 1910.....		Philadelphia, C. P.
Candidus, Philip C.....	Mobile, Ala.	1857.....	June 17, 1831.....	March 6, 1910.....	Fred. L. Caldwell.	
Carteighe, Michael.....	London, Eng.	Hon.				
		Member				
		1882.....	1841.....	May 30, 1910.		
Dohme, Louis.....	Baltimore, Md.	1859.....	July 6, 1837.....	Dec. 12, 1910.....	A. P. Sharp.....	Maryland C. of P.
Eliel, Leo.....	South Bend, Ind.	1883.....	October 26, 1845.....	Feb. 10, 1911.		
Forbes, J. Winchell.....	Cincinnati, Ohio.	1905.....		January, 1911.....		
Haake, Wm. Henry.....	Cleveland, Ohio.	1893.....		Oct. 18, 1910.....		Philadelphia, C. P.
Hall, Frank M.....	Denver, Col.	1908.....	1862.....	— 1910.		
Hallberg, C. S. N.....	Chicago, Ill.	1879.....	October 13, 1856.....	Oct. 22, 1910.....	Dr. S. M. Sellers.....	Philadelphia, C. P.
Mason, Myron R.....	Angel Island, Cal.	1904.....	1868.....	June 29, 1910.....		University of Kansas.
McAdams, Wm. J.....	Pittsburg, Pa.	1908.....	1870.....	— 1910.....		
Rafter, Michael.....	New York, N. Y.	1908.....		Nov. 13, 1910.		
Von Stein, John H.....	Columbus, Ohio.	1904.....	1853.....	Nov. 14, 1910.....	A. Bellhardt.	
Webber, J. Leroy.....	Brooklyn, N. Y.	1886.....	1853.....	Nov. 25, 1910.....		Philadelphia, C. P.
Quandt, Ernest E.....	Baltimore, Md.	1909.....	Sept. 12, 1865.....	January 17, 1911....	Sharp and Dohme...	Maryland C. of P.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage such proper relations among Druggists, Pharmacists, Physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council. They shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the interest of which for any current year only may be used by the Association for its expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted

in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution. Any proposition to amend the Constitution for the purpose of permitting the expenditure of the permanent invested funds of the Association, shall require a majority of seven-eighths for its passage.

BY-LAWS.

CHAPTER I.

Of the Election of Officers.

ARTICLE I. A Nominating Committee shall be annually chosen, whose duty it shall be annually, at the meeting, to select candidates for the offices of President, three Vice-Presidents and three members of the Council.

ARTICLE II. The Nominating Committee shall submit the names of three persons as candidates for each of the offices of President, First Vice-President, Second Vice-President, Third Vice-President, and three members of the Council. These names are to be submitted by the General Secretary by mail to every member of the Association, together with a request that the member indicate his preference on a ballot enclosed for that purpose, and return the same by mail within one month after the adjournment of the annual meeting.

ARTICLE III. The ballots received as indicated in the preceding article are to be sent by the General Secretary to a Board of Canvassers, composed of three members to be appointed by the President, who shall count as votes in the annual election only the votes of those members whose dues have been paid for the current year, and who in turn shall certify to the General Secretary the result of the election, after which the latter shall be published in the *Bulletin* of the Association.

ARTICLE IV. The officers thus elected by a plurality of the votes cast shall be installed at the final general session of the next annual meeting.

ARTICLE V. The Reporter on the Progress of Pharmacy, the Treasurer and the General Secretary shall be elected annually by the Council.

CHAPTER II.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER III.

Of the General Secretary.

ARTICLE I. The General Secretary shall be elected annually and shall receive from the Treasurer an annual salary not to exceed \$1200, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report of the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose, shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

CHAPTER IV.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the General Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists, may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER V.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the General Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary not to exceed \$750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of \$15,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by a Trust Company acceptable to the Council.

CHAPTER VI.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary not to exceed \$750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the General Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the General Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materna Medica, and the collateral branches of knowledge; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1. An introduction or synopsis of the Report is to be presented to the Section on Scientific Papers.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the General Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VII.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, to reduce any appropriations that have been made, whenever in their judgment the current receipts are not sufficient to allow the expenditure, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

ARTICLE II. The Council shall consist of ex-officio members; one member from each local branch of this Association and nine other members, selected from such members as have had at least three years' membership in this Association, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years.

ARTICLE III. The President, Vice-Presidents, General Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, Editor of the Bulletin, the Chairmen of the Sections of the Association, the Secretary of the Council, and the Historian of the Association shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

Whenever deemed advisable by the Council, it shall after the publication of each edition of the National Formulary appoint a committee of fifteen members from the general membership of the Association, which committee shall have charge of the revision of the Formulary. This committee shall report annually or as often as required to the Council and shall continue to serve until the edition for which it was appointed has been completed. Vacancies occurring in this committee shall be filled by the Council as quickly as is expedient.

ARTICLE VIII. *Section 1.* The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual Report of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sessions of the Association and of the Sections, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as it may deem worthy of insertion. It shall also fix the price at which the Proceedings may be sold.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, also editors and publishers of pharmaceutical journals, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership; provided that any person whose name has been dropped from the roll of members for non-payment of dues may be readmitted after having again made application in regular form, the application being accompanied by the usual fee; or he may be readmitted, without such application, on payment of all back dues; in the latter case his membership shall date from the time when he first joined the Association, as previously printed in the Roll of Members, and notice of such action shall be inserted in the addendum to the Treasurer's report.

ARTICLE II. Every application for membership shall require the endorsement of two members of the Association in good standing, and each applicant must receive the affirmative vote of three-fourths of the members of the Council for election, after which his membership shall be completed by his signing the Constitution and By Laws and paying the annual dues for the current year. Any newly-elected member, upon the payment of the annual dues for the year in which he is elected, shall be entitled to the annual volume of the Proceedings and all publications of the Association that are distributed to its members during the year. Any applications for membership made during the fiscal year viz., between July 1 of one year and July 1 of the following year shall be considered as of the current fiscal year; except that persons applying on or after March 1st shall not be *required* to pay the annual dues for that year, but if they do pay such dues they shall receive all the publications to which members are entitled for the year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and by neglecting to pay said contribution for *three successive years* he may be dropped from the Roll.

ARTICLE IV. Any member of the Association who shall pay to the Treasurer the sum of \$100.00 during the first year of his connection therewith, and also any member not in arrears, who after ten years shall pay the sum of \$75.00, or after fifteen years the sum of \$50.00, or after twenty years the sum of \$25.00, and any member who may have paid annual dues for thirty-seven consecutive years, shall become a life-member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials shall be sent to the General Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Three Dollars* or of *Five Dollars*, to receive from the Treasurer respectively a *paper* or *parchment* certificate of membership signed by the President, one Vice-President, the General Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the General Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER IX.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, five Sections shall be formed, as follows: 1. Section on Scientific Papers; 2. Section on Commercial Interests; 3. Section on Practical Pharmacy and Dispensing; 4. Section on Pharmaceutical Legislation and Education; 5. Section on Historical Pharmacy.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read the minutes of Council, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. At the fourth and fifth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VII. The sixth and seventh sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VIII. The eighth and ninth sessions shall be devoted to the subject of Practical Pharmacy and Dispensing.

ARTICLE IX. The tenth session shall be devoted to the subject of Historical Pharmacy.

ARTICLE X. A Chairman and a Secretary shall be elected by ballot by each Section to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the General Secretary for publication and safe-keeping.

ARTICLE XI. The Chairman of each Section shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE XII. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XIII. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the General Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

Section 6. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

Section 7. The President shall call the roll of States, the Territories, District of Columbia and the Provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association, and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

Section 8. Incidental business.

ARTICLE XIV. The order of business at the second general session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read.

Section 4. Reading of the Minutes of the Council.

Section 5. Reading of the Reports of the Treasurer and General Secretary.

Section 6. Reports of Standing Committees shall be read.

Section 7. Reports of Special Committees shall be read.

Section 8. Incidental business.

Section 9. Adjournment subject to the call of the President.

ARTICLE XV. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XVI. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XVII. At the last general session of the Association the newly-elected officers of the Association shall take their respective places.

ARTICLE XVIII. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

CHAPTER X.

Of Committees.

ARTICLE I. There shall be appointed or elected eleven Standing Committees as follows: a Committee on the U. S. Pharmacopoeia and a Committee on Transportation, each to consist of ten members; a Committee on the Pharmaceutical Syllabus, to consist of seven members; a Committee on Time and Place of Meeting, a Committee on Commercial Interests and a Committee on Pharmaceutical Education and Legislation, each to consist of five members; a Committee on Scientific Papers, a Committee on Practical Pharmacy and Dispensing, a Committee on Historical Pharmacy, a Committee on Ebert Prize, and a Committee on General Prizes, each to consist of three members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. It shall arrange the business of the Section, and shall report a number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person desiring to submit a paper to the Association shall present to the Chairman of the particular Section to which it refers, at least ten days prior to the meeting, an abstract of said paper, indicative of its contents, and consisting of not less than fifty nor more than two hundred words.

This abstract shall be printed as a part of the programme. The paper itself must be submitted to the officers of the Section previous to the first session. Not more than ten minutes shall be allowed for the presentation of any paper, unless by unanimous consent of the Section.

ARTICLE V. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, at the next annual meeting after the one at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE VI. The Committee on General Prizes, which shall be appointed by the President, shall, at the next annual meeting after the one at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VII. The Committee on Practical Pharmacy and Dispensing, composed of members actually engaged in the retail drug business, shall be elected by the Section on Practical Pharmacy and Dispensing. It shall arrange in advance the business to come before the Section at the next annual meeting. It shall propose a series of subjects for general discussion, and solicit papers on subjects pertaining to the actual practice of pharmacy in retail stores.

ARTICLE VIII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. It shall report at each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section. It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE IX. The Committee on Historical Pharmacy shall be elected by the Section on Historical Pharmacy. It shall arrange the business of the Section and shall present annually matters of special historical interest in pharmacy. It shall also secure the collection of letters, papers, etc., written by members of the Association, which when so collected shall remain in the custody of the committee and be available for reference to any one interested.

ARTICLE X. The Committee on the United States Pharmacopœia shall be appointed by the President of the Association, as follows: One member to be appointed for ten years and one for nine, eight, seven, six, five, four, three, two and one years respectively, each vacancy occurring by expiration of term to be filled by a new appointment for ten years. The Committee shall elect its own Chairman annually. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

ARTICLE XI. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul or Minneapolis, Denver and San Francisco, and in conjunction with the General Secretary and the Local Secretary, who shall be members of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. The Council shall annually elect the Chairman of this Committee.

ARTICLE XII. The Committee on the Pharmaceutical Syllabus shall be appointed by the President of the Association as follows: One member shall be appointed for seven years, and one for six, five, four, three, two and one years respectively; each vacancy occurring from expiration of term shall be filled for a term of seven years; other vacancies shall be filled at the annual meetings of the Association for the unexpired terms.

This committee shall report to the Association through the Section on Pharmaceutical Legislation and Education, shall be members of the National Committee on the Pharmaceutical Syllabus and shall recommend to the Association its proportionate share of the current expenses.

CHAPTER XI.

Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

ARTICLE V. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

CHAPTER XII.

Local Branches.

ARTICLE I. Local branches of this Association may be formed wherever it may appear that twenty-five members of this Association, in good standing, will participate, provided that no more than one such branch shall be formed in any one State, province, district or territory, unless the additional branches shall be formed at a point distant one hundred miles or more from any branch already established in the same State, province, district or territory.

ARTICLE II. All active or voting members of local branches must be members of this Association in good standing.

ARTICLE III. The objects and aims of local branches of this Association shall be the same as set forth in Article I of the Constitution of this body, and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it. And no local branch shall enact any article of Constitution or By-Law in conflict with the Constitution or By-Laws of this Association.

ARTICLE IV. Each local branch having twenty-five active or voting members shall be entitled to elect one member every three years, who shall become and continue a member of the Council of this Association for that time.

CHAPTER XIII.

Miscellaneous.

ARTICLE I. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary not to exceed \$300.

ARTICLE II. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

ARTICLE III. The Secretary of the Council shall also officiate as Secretary of the Committee on Membership.

CHAPTER IV.

Of Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of seven members of the Council, to be elected annually by ballot. The General Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect its chairman immediately after the election of its members by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present to the Council the list of applicants for membership who have complied with the requirements of the By-Laws of the Association.

ARTICLE III. It shall furnish appropriate biographical sketches of deceased members for publication in the Report of the Proceedings.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council. Immediately after its election by the Council, the Committee shall elect a Chairman.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Report of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the General Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Sessions.

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Nine members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:
 - a. Committee on Membership, consisting of seven members of the Council, the General Secretary and the Treasurer.
 - b. Committee on Finance, three members.
 - c. Committee on Publication, five members.
 - d. Committee on Centennial Fund, three members.
3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present, a majority of the votes cast being considered sufficient to decide a question. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888, 1895, 1900, 1901, 1903, 1909, 1910.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

All bills for payment shall take the following course: The correctness of the bill shall be certified to by the person contracting the same. After approval by the General Secretary, he shall endorse upon the bill the appropriation against which it is to be charged, and submit it to the chairman of the Finance Committee for his approval. A warrant shall then be drawn and signed by the General Secretary and the President upon receipt of which the Treasurer shall draw a check for the amount.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Treasurer shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him.

Sixth, There shall be annually appointed by the Council an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, as that in which the Treasurer resides, the Chairman to be named by the Chairman of the Council.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer, having thus balanced his books and made out his report, shall place all his books, accounts, vouchers, etc., with the report, at the disposal of the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Treasurer, in the presence of another member of the Association, shall make a list of the numbers and amounts of the bonds belonging to the Association, and both shall make affidavit to such list, which shall then be forwarded to the Auditing Committee for their use in auditing the books of the officers of the Association.

Ninth, Said books, accounts, vouchers, saving-bank books and accounts of the same shall be returned to the Treasurer within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

Thirteenth, The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council. All motions and resolutions involving the expenditure of any sum in excess of twenty-five dollars shall be referred to the Finance Committee before being acted upon by the Council. *Provided*, however, that the Treasurer shall be authorized to transfer from one account to another, such amount as may be needed at any time, the amount of any such transfer not to exceed the sum of fifty (50) dollars.

Fourteenth, All balances remaining from appropriations at the close of each fiscal year shall be turned back into the treasury, unless otherwise ordered by the Council.

Fifteenth, The Chairman of the Council is instructed to appoint three members of the Association who, together with the Treasurer, shall be known as the Committee on Invested, Savings and Trust Funds.

Of the three members first appointed, one shall be appointed for one year, one for two years and one for three years. Each year thereafter, one member shall be appointed for three years. Members of the committee need not be members of the Council.

It shall be the duty of the said committee to carefully consider the nature and status of all invested, savings and trust funds of the Association, and to make an annual written report upon the same to the Council, which report shall be read (in full) at one of the general sessions of the annual convention of the Association, and published in full in the annual volume of Proceedings thereof.

The present custody of the funds shall not be affected by the adoption of these resolutions, neither shall the committee have the power to invest or re-invest any of such funds, except as instructed by the Council or Association.

GENERAL RULES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the forty-seventh annual meeting of the American Pharmaceutical Association, held at Put-in-Bay, O., Sept. 4-12, 1899, the Council resolved that no advertisements be solicited or accepted for any of the publications or programs issued by or in the name of the Association, and the General Secretary was instructed to inform annually the Local Secretary and the Pharmaceutical Press of the resolution.

At the annual meeting of 1907, held in New York City, it was ordered that the three-year term of members of the Council elected by local branches of the A. Ph. A. shall date from the last annual meeting of the Association held previous to the date of election of the new Council member by a local branch. (See Proc. 1907, p. 25.)

At the fifty-seventh annual meeting, held at Los Angeles, Cal., August, 1909, it was ordered that space be annually set aside in the Proceedings for abstracts of the proceedings of the meetings of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties.

It was further ordered that the salary year of the officers of the A. Ph. A. be changed so as to run from July of one year to July of the next year, instead of, as heretofore, from September to September. (See Proc. 1909, p. 452.)

It was also ordered that the names of life members, new style, be designated in the Roll and List of Members by means of heavy or black-faced type. (See Proc. 1909, p. 459.)

At the fifty-eighth annual meeting it was ordered that the Committee on Membership submit all names of applicants for membership to the respective State representative on the committee for approval before sending the application to the secretary of membership for submission to the vote of Council, or if they be sent direct to the secretary of the Committee on Membership they shall be sent by him, first to the State representative, for approval.

It was further ordered that the resignation of a member may be accepted during the first six months of the fiscal year for which his annual dues are payable.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

ENGLAND.

E. M. Holmes, F. L. S., *London*, 1899.

GERMANY.

Dr. Edward Schaer, *Strassburg*, 1877.

Dr. Ernst Schmidt, Geh. Regierungsrath,
Marburg, 1899.

Dr. Arthur Meyer, *Marburg*, 1910.

INDIA.

David Hooper, F. I. C., F. C. S., *Calcutta*, 1899.

SWITZERLAND.

Dr. Alexander Tschirch, *Bern*, 1910.

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ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the General Secretary and Treasurer of all changes of address.

(The names of Life Members in **black type**. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Auburn.

Miller, Emerson Romeo.1895

Fort Morgan.

Thurston, Edwin Joseph.....1904

Gadsden.

Cross, Elias Howell.....1905

Whorton, Carl1908

Guntersville.

Thomason, William Pearce1910

Mobile.

Eichold, Bernard Herbert1905

Herty, Frank James.....1907

Roe, John T.1907

Van Aller, Thomas S.....1907

Van Antwerp, James Callanan.....1905

Montgomery.

Knabe, Gustavus Alexander.....1876

Prattville.

Scott, Clarence Alexander1905

Talladega.

McDiarmid, Daniel Palmer1909

Tuscaloosa.

Bingham, William Ellison.....1909

Tuskegee.

Lewis, Lawrence Campbell1910

ALASKA.

Douglas.

Smith, Guy Livingstone.....1909

Ketchikan.

Ryus, Floyd Eugene1909

St. Michael.

Wood, Richard Allen1910

ARIZONA.

Clifton.

Stevenson, Anderson William1908

Prescott.

Brisley, Harry.....1894

Tucson.

Lough, Thomas Warner.1905

ARKANSAS.

Arkansas City.

Dedman, Richard1908

Batesville.

McMahon, Stonewall Jackson1908

Blytheville.

Paris, James Ernest.1908

Camden.

Morgan, Aylmer Lee1890

Charleston.

Yunker, Charles Harman1908

Clarksville.

Warren, Robert Arthur.....1907

England.

Ayres, Gold.....1907

Fort Smith.

Carnahan, John Hurley 1910
 Sparks, James Mitchell. 1894

Hope.

Gibson, John Sceva 1908

Hot Springs.

Bancroft, Richard Bayard 1907
 Battles, Wilton Lamar 1908
 Beasley, Robert Sidney 1906
 Eisele, Martin Augustine 1907
 Hogaboom, George Adelbert.. 1907
 Humphreys, Charles John 1907
 Jeffrey, Frank Dana 1907
 Jennings, Algernon Coleman 1907
 Klein, Ernest Frederick 1894
 Lehman, Charles Walter 1907
 Nutt, Sidney Matthews 1908
 Rowles, James Osborne 1908
 Schachleiter, Francis George 1906
 Schneck, George Earl 1908
 Taylor, Carleton F. 1908
 Weimar, Henry 1907
 Whittington, William George 1908

Imboden.

Ketchum, James Spear. 1907

Little Rock.

Bond, John Barnitz 1883
 Bond, William Catis. 1907
 Bordeaux, Henry 1907
 Dowdy, Joseph Franklin 1908
 Ehrlich, Sigo 1910
 Fein, Mary Augustine 1907
 Halliburton, Orlando 1908
 Hodges, Jesse Dibrell 1909
 Snodgrass, Latta Kavanaugh 1901
 Stahel, Albert William 1907

Marianna.

Harrington, Vincent Moore, Jr. 1909

Okolona.

Young, James Joseph 1908

Paris.

Hahn, Philip Anton 1908

Piggott.

Potter, Maynard H 1906

Pine Bluff.

Dewoody, William Lawrence 1887

Pocahontas.

Hamil, William Earle 1908

Spadra.

Stewart, John William 1908

Stuttgart.

Webb, John William 1908

Warren.

Appleton, William Riley 1901

CALIFORNIA.

Alameda.

Sutherland, George McKenzie 1909

Arcata, Humboldt Co.

Keller, William Otto Emanuel 1908

Auburn.

Stevens, Frederick Solon 1903

Bakersfield.

Hughes, James Albert 1909

Eureka.

Bohmansson, Robert Hugo 1901

Corre'l, Eugene Philip 1909

Keller, Charles Frederick, Jr. 1908

Fortuna.

Bowman, Reginald Hamilton 1909

Fresno.

Smith, George Henry 1909

Fruitvale.

Philip, Waldemar Bruce 1908

Gilroy.

Johnson, Edward Franklin 1909

Hanford, Kings Co.

Hefton, Wallace Merlin 1909

Haywards.

Sporndli, Ernest 1906

Kingsburg.

Kimberlin, Ernest Marion 1909

Livermore.

McKown, Joseph Oscar 1906

Long Beach.

Lamb, John Amos. 1909

Smith, Harley Earl 1903

Smith, Lauriston Stephen. 1892

Los Angeles.

Binz, Edward Gabriel.....	1909
Dickinson, William Richard	1909
Diggs, Lowell Clyde	1907
Dyna, Carl Frederick Julius.....	1909
English, William Morrison.....	1907
Freeman, James Joseph	1909
Guest, Wilbert Hillman	1909
Howard, Mrs. Fletcher.	1905
Jacobson, William Fosberg.....	1909
Jones, Thomas William.....	1907
Kirkland, Derwentwater.....	1889
Lauer, Emanuel Hiram.....	1909
Laux, Carl.....	1909
Leitsch, James Craig.	1907
Lewis, George Arthur	1909
Maas, Arthur Richard.....	1909
McKenna, Harry A.....	1907
Owen, Frank Dale.....	1907
Peairs, Howard Allen	1907
Porter, G. Ellis.....	1909
Ramage, Robert Courtland.....	1909
Voeckell, Henry G.....	1909
Watters, Alexander John.....	1909
Wilson, George Baright	1907

Mare Island.

Hammar, Alik.....	1897
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Merced.

Cody, Nelson Lowell Adams	1909
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Mountain View.

Wagner, Louis.....	1908
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Oakland.

Kaplansky, David	1909
Leet, Robert Andrew	1907
Tobriner, Isaac.....	1909
Varney, Edward Francis	1892

Ontario.

Jesson, Jacob.....	1872
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Orland, Glenn Co.

Birch, May Cushman.....	1909
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Oroville.

Green, Robert Moore	1909
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Pasadena.

Leavitt, Adoniram Judson	1905
Ward, Charles Horatio.	1909

Pomona.

Armour, Elmer Eugene.....	1909
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Sacramento.

Lichthardt, George Henry Philip ...	1902
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San Anselmo.

Hund, George Benard.....	1910
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San Diego.

Strahlmann, Edward.....	1909
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San Francisco.

Arkin, James Andrew	1908
Ashim, Barach Jacob.....	1908
Baer, Edward Arthur.....	1907
Baldwin, Edwin Lewis.....	1909
Bayly, Charles Alfred	1889
Boulton, Emison Allen.....	1902
Bowerman, Kenneth Burton	1909
Boyken, John William.....	1902
Boyson, John Henry.....	1905
Briggs, Armand Eugene	1907
Brooks, Phipps Ira	1909
Carey, Henry Benjamin	1909
d'Artenay, Eugene.....	1907
Dawson, John Henry	1882
Donahue, Henry M.....	1907
Drossel, August Adolph	1902
Drucker, August Elisha.....	1904
Eschmann, Clemens Ludwig	1907
Esters von Krakau, James Henry Wil-	
liam	1897
Fletcher, David Maass.....	1904
Flint, John Henry	1909
Green, Franklin Theodore.....	1908
Guehring, John, Jr.....	1907
Headen, Claude Thomas.....	1909
Hedegard, Hans Christian.....	1909
Jorgenson, Edward B.....	1902
Lackenbach, Frederick Isadore.....	1907
Lengfeld, Joseph Louis.....	1909
McDonnell, Herbert Leslie.....	1908
Neal, Charles W.....	1907
Poehner, Adolf Adam.....	1907
Prior, Toney.....	1905
Roehr, Clarissa May.....	1908
Schmidt, Albert Frank.....	1909
Schmidt, Valentine	1887
Schneider, Albert.....	1899
Selzer, Elliott Edward.....	1909
Sharp, Solomon Albert	1902
Stange, Carl Frederick.....	1897

Steele, James Gurden1859
 Wenzell, William Theodore1870
 West, Fred.....1906
 Whilden, Charles Bennett1907
 Winter, James Henry.....1904
 Zane, Ralph Raymond1909

Sanger.

Brehler, Oscar August.....1909

San José.

Munson, James Grant.....1908
 Pellerano, Nicholas Andrew.....1909
 Taylor, Walter Thomas.....1907

San Luis Obispo.

Dawson, Byron Francis.....1909

San Mateo.

Baskette, Frank E1907

San Rafael.

Kronberger, Israel Baruch.....1908

Santa Ana.

Dean, Harry Glenn.....1907
 Kelley, Charles Sprewell.....1909

Santa Rosa.

Hahman, Paul Theodore.....1909

Sausalito.

Campbell, William Warner.....1910

Sebastopol.

Worth, Thomas Renfro.....1909

Williams.

Harrington, Michael Timothy, Jr.....1908

COLORADO.

Boulder.

Bedard, George Henry1908

Canon City.

Seeley, Anton H.....1908

Central City.

Best, John.....1886
 Davies, Llewellyn Powell.....1891

Colorado Springs.

Butcher, David Yerley1910
 Depeyre, Louis Noel1894
 Martin, Franklin Haynes.....1909

Cripple Creek.

Beitenman, William Wallace.....1888
 Lewis, Griffith R.....1909
 Shockey, William L.....1909

Delta.

Horting, Chester E.1911

Denver.

Alkire, Lewis L.....1908
 Anglum, John1902
 Austin, Frank A.....1910
 Bieser, Charles Leonard1908
 Boutwell, Lester T1910
 Bresler, Simon L.....1908
 Bridaham, Lester Burbank.....1910
 Clark, Alfred William.....1908
 Clayton, Charles J.....1905
 Ford, Charles Mangan.....1887
 Hover, William Adgate.....1895
 Kunz, Calvin W.....1910
 McCrea, Harry Francis1908
 McKenzie, Robert Henry.....1908
 Martin, John Albert.....1909
 Nitardy, Ferdinand William.... 1905
 Scholtz, Edmund L.1909
 Skinner, Charles H.....1909
 Soetje, Edward C.....1908
 Steadman, Prescott Lawrence1909
 Swoboda, Adolph.....1909
 Taylor, George Edward.....1895
 Thebus, William Frederick.....1908
 Ward, Augustus Jae.....1898
 Wilson, Lincoln.....1910

Fort Collins.

Scott, Alexander Weir.... 1906

Glenwood Springs.

Barnes, Charles Dean1908
 Parkinson, Will Sanders.....1908

Grand Junction.

Sturtevant, Samuel Bevier1908

Holyoke.

Smith, Frank Myron1908

Lafayette.

Dow, John Peter.....1904

Leadville.

Kolsch, Julius.....1902

Longmont.

Witting, Frederick Frank.....1902

Louisville.

Huber, Joseph Anton 1908

Pueblo.

Ford, Robert Emmet 1910

Mortenson, Frank Emil 1910

Strunz, Christopher Ernest 1908

Wray.

Shumaker, Jacob L 1910

Yuma.

Dakan, Eugene Sue 1910

COLUMBIA, DISTRICT OF.

Anacostia.

Weiss, Conrad Henry 1900

Washington.

Blackmore, Henry Spencer 1896

Boyd, George Washington 1883

Bradbury, Wymond Henry 1895

Easterday, Herbert Clifton 1893

Flemer, Louis 1895

Floyd, Henry Bussey 1908

Franzoni, Joseph Dunbar 1900

Gahn, Henry 1902

Hale, William Worth 1910

Henkel, Alice 1902

Henry, Frank Clinton 1894

Herbat, William Parker 1895

Hilton, Samuel Louis 1890

Hoover, George William 1905

Hunt, Reid 1904

Hurlebaus, George William 1895

Kalusowski, Henry E. 1904

Kebler, Lyman Frederic 1894

Keemer, Edgar Brooks 1907

Major, John Richards 1873

Motter, Murray Galt 1904

Neeley, Guy Minick 1900

Pearson, Paul 1908

Pozen, Morris A. 1909

Quigley, Richard Lucien 1902

Rabak, Frank 1905

Richardson, Willard Stowell 1900

Schaffer, Charles 1903

Scott, Edward Burroughs 1905

Seidell, Atherton 1907

Sievers, Arthur 1906

Spangler, Lewis Clayton 1902

Spire, William Burton 1908

Stearns, Cletus Otto 1906

Stevens, Edward 1903

Taylor, Augustus Carrier 1900

True, Rodney Howard 1904

Weller, Franklin Pierce 1900

White, Joseph Leyden ... 1909

Wilbert, Martin Inventius 1902

Wiley, Harvey Washington 1902

CONNECTICUT.

Bethel.

Garvin, Patrick Joseph 1905

Bridgeport.

Hartigan, Joseph Dennis 1902

Hindle, William Percy 1908

Jamieson, George Alexander 1903

Levery, John Augustine 1900

Ostrofsky, Frank Joseph 1910

Danielson.

Morin, Ludger Joseph 1905

Hartford.

Rapelye, Charles Andrew 1876

Seinsoth, John Jacob 1900

Meriden.

Mosher, William Wooster 1894

Middletown.

Pitt, John Richard 1872

New Haven.

Fleishner, Charles ... 1905

Gessner, Emil Adolph 1878

Hodgson, Joseph Arthur 1903

Spalding, Clarence Gilman 1910

Wood, Alonzo Felton, Jr. 1890

Wood, James Prior 1890

New London.

Daboll, Horace Hart 1903

Rockville.

Woodall, Frederick 1908

Simsbury.

Lathrop, Arthur E. 1910

Stamford.

Finch, Charles Smith 1900

Waterbury.

Ebbs, John Buddington 1905
 Roemer, Frederick 1905
 Walker, Robert 1908
 Wilcox, Levi 1903
Woodruff, Roderick Samuel 1876

Winsted.

Julison, Arthur F. 1907

DELAWARE.

Middletown.

Truitt, Ernest Alexander 1908

Seaford.

Haines, William Fischer 1908
 Kaufman, Reuben M. 1909

Wilmington.

Watson, Herbert Kennedy 1888

FLORIDA.

Clearwater.

Allen, Bertram 1909

De Land.

Fisher, George Washington. 1893

Fort De Soto.

Goodman, Frank Stockett 1907

Gainesville.

Johnson, Washington M. 1910

Jacksonville.

Bettes, C. C. 1909
 Cameron, Simon H. H. 1909
 Dixon, John Marion 1894
 Kirk, James Edgar 1903

Ocala.

Groves, Henry Conrad 1903

Palatka.

Haughton, Joseph Husson 1910
 Ramsaur, David Wilfong 1902

Pensacola.

Pettersen, Ernst Wilhelm. 1905
 Stearns, William Lincoln 1903

Satsuma Heights.

Richtmann, William Oscar 1904

St. Augustine.

Speer, Charles Claude 1902

Tampa.

Berger, Ernest 1902
 Russell, Hamilton 1905
 Taylor, Milton Mannasseh 1909

GEORGIA.

Atlanta.

Elkin, William Simpson 1905
 Hicks, John Elias Faison 1910
 Payne, George Frederick 1893
 Pitts, William Burton 1903

Augusta.

Land, Robert Henry 1859
 Land, Robert Henry, Jr. 1902

Fitzgerald.

Goodman, John Hawkins, 1904

Greensboro.

Rice, Thaddeus B. 1909

Greenville.

Culpepper, Thomas Jefferson 1903

Macon.

Clark, Mallie Adkin 1908
 Gidley, William Francis 1910
 Morris, Max 1898

Savannah.

La Grange, John V. 1905
 Rowinski, Robert Antone. 1892
 Solomons, Isaiah Abram 1894

Thomasville.

Thomas, Robert, Jr. 1880

HAWAIIAN ISLANDS.

Honolulu.

Beck, Julius Edward 1904
 Pfluger, Henry Christian 1903
 Rumsey, Samuel Lewis 1876

Kalawao, Molokai.

Gibson, Frank Leighton 1904

IDAHO.

Aberdeen.

Dvorak, Joseph Thomas 1908

Ashton.

Brathen, O. A. 1910

<i>Boise.</i>		<i>Bartlett, Nicholas Gray</i>	1861
Ballou, Clarence Orlando	1909	Bate, Henry John	1906
<i>Buhl.</i>		Bauer, Jacob	1879
Elison, James Ross	1910	Becker, Irwin Atwood	1905
<i>Grangeville.</i>		Behrens, Emil Christian Lewis	1893
Pulse, John J.	1908	Bell, John Michael	1908
<i>Pocatello.</i>		Bellack, Berthold H.	1909
Whittlesey, H. H.	1910	Biermann, William Henry	1908
<i>Shoshone.</i>		Biroth, Henry	1865
Starrh, Thomas McLelland	1909	Blahnik, Karel Bartholomae	1907
<i>Twin Falls.</i>		Blahnik, Marie (Mrs.)	1905
Bedford, Clifton Crews	1910	Blocki, John	1909
Skeels, Howard Morton	1907	Bodemann, Wilhelm	1906
Spargur, Ray Miles	1910	Boehm, John J.	1905
Sprague, Adelbert N.	1910	Brenner, George Frederick	1906
ILLINOIS.		Brown, William Henry	1910
<i>Allon.</i>		Bruder, Otto Emil	1905
Riley, Cassius Marcellus	1901	Brunn, Harold Nicolai	1905
<i>Arrowsmith.</i>		Buthlein, Fred. L. G.	1908
Lester, George Friend	1910	Cassin, Elmer Eldorado	1907
<i>Aurora.</i>		Christensen, Henry C.	1906
Frauenhoff, Frederick Louis	1909	Clark, Albert Henry	1905
Staudt, Louis Carl	1890	Colson, Henry William	1910
<i>Berwyn.</i>		Cooban, Benjamin Slater	1902
Rinde, Samuel Nelson	1909	Covault, Bert M.	1910
<i>Cairo.</i>		Crawshaw, Herbert Harwood	1907
Metzger, Arthur Shuh	1908	Crowley, James Patrick	1908
Metzger, Matthias Clyde	1902	Day, William Baker	1895
Schuh, Paul Gustav	1894	Dieden, Frank Xavier	1905
<i>Camp Point, Adams Co.</i>		Druehl, Amanda Stahl (Mrs.)	1903
<i>Bartells, George Case</i>	1881	Druehl, Louis A.	1908
<i>Carlinville, Macoupin Co.</i>		Engelhard, George Pierre	1903
Loehr, Theodore Christian	1888	Fantus, Bernarda	1908
<i>Carthage.</i>		Feldkamp, Charles Louis	1908
Robertson, Charles E	1910	Fenger, Frederic	1910
<i>Chicago.</i>		Fischnar, John Ferdinand	1905
Ackerman, Albert George	1909	Forbrich, Joseph Francis	1908
Adamick, Gustave Hattenhauer	1891	Foucek, Charles G.	1909
Ade, Daniel Andrew	1906	Fry, Herman	1902
Anderson, Carl Godfrey	1907	Fry, Narcys George	1906
Avery, Charles Hamilton	1905	Fuller, Oliver Franklin	1869
Bartlett, James E.	1906	<i>Gale, Edwin Oscar</i>	1857
		<i>Gale, William Henry</i>	1857
		Gathercoal, Edmund Norris	1905
		Glogan, Alexander. ...	1908
		Gordin, Henry Mann	1899
		Grassly, Charles William	1884
		Gray, Margaret McClintock (Mrs.)	1901
		Gray, William	1892
		Haeseler, Loren Milton	1906
		Hartwig, Otto Julius.	1892
		Hauber, Peter Paul	1906

Heinemann, Lucy.	1908	Ruesch, William Emmanuel.	1907
Hellmuth, Joseph Anthony.	1905	Sandkoetter, Henry P.	1908
Hermanek, Joseph Charles.	1904	Sass, Stephen Konrad.	1905
Hilpert, Willis Store.	1908	Sawyer, Hilton Hill.	1906
Hood, Harry Alling.	1910	Scheffel, Louis.	1908
Hottinger, Otto George.	1910	Scherer, Andrew.	1884
Irvine, Ephraim Dinsmore.	1908	Schimelfenig, Charles Howard.	1908
Jamieson, Thomas Nevin.	1903	Schmid, Louis A.	1911
Jehlik, Anton Josef.	1906	Schmid, Rose Phillipus.	1911
Jensen, Gerhard H.	1906	Schmidt, Frederick Michael.	1887
Josenhans, Reinhardt C. J.	1907	Schweitzer, Joseph.	1906
Kahn, Julius H.	1905	Secord, George Louis.	1910
Klenze, William Theodore.	1905	Sheblessy, Michal Albert.	1909
Klore, William Walter.	1908	Shurtleff, Wilford C.	1905
Knoche, William Philip.	1908	Sisson, Oscar Ulysses.	1910
Kramer, Wilhelm.	1908	Snow, Clyde Mason.	1903
Krvavica, Antony.	1907	Snyder, William Edward.	1909
Ladish, Erich Herman.	1905	Stadelmann, Hany Edgar.	1909
Langenhan, Henry August.	1908	Stephan, Otto Paul.	1909
Larsen, Lars Peter.	1908	Stimson, Charlotte Elizabeth.	1905
Lehman, Louis.	1905	Storer, Charles Adelbert.	1906
Lestina, J. M.	1910	Stulik, Charles.	1910
Letzler, Alex. Emil.	1906	Truax, Charles.	1882
Lorenz, John Stanley.	1906	Umenhofer, Adolph.	1908
Lueder, John T.	1909	Van Ness, George Ide.	1904
Mares, Frank Martin.	1902	Van Schaack, Cornelius Peter.	1905
Marr, William G.	1908	Voiss, Arcadius.	1901
Martin, John Fraley.	1905	Warren, Lewis Eugene.	1909
Mason, Ernest Lynn.	1908	Wells, James Herbert.	1908
Mathison, Soren.	1905	Weydell, K. Albus.	1900
Matthews, Charles Edwards.	1893	Whitfield, Thomas.	1865
McClugage, John Jordan.	1905	Williams, Seward Whiting.	1887
McConnell, Charles Henry.	1899	Wilson, Charles Frazee.	1906
McPherson, George.	1865	Wilson, Richard Bruce.	1908
McQuillen, Francis.	1906	Winberg, Washington William.	1906
Meixner, Fred Morris Frankford.	1906	Woltersdorf, Louis.	1865
Meyer, Frederick Hugo.	1907	Wooten, Thomas Victor.	1893
Miller, Albert.	1907	Yeomans, Sidney Clarence.	1906
Miner, Maurice Ashbel.	1880	Zeman, Otto.	1911
Myers, Charles Joseph.	1905	Zurawski, Narcys J.	1906
Mygdal, Thorkil.	1908		
Oglesby, George Daniel.	1905		
Oldberg, Oscar.	1873		
Patterson, Charles Waggener.	1905		
Patterson, Theodore Henry.	1869		
Pelikan, Louis Joseph.	1910		
Peska, Alexander Casimer.	1909		
Pierce, Olive Blake.	1906		
Potts, Thomas Humphreys.	1906		
Puckner, William August.	1888		
Rhode, Rudolph Ernst.	1887		
Rommel, Hans Carl.	1907		
		<i>East St. Louis.</i>	
		Knoebel, Percy Thomas.	1907
		Knoebel, Thomas.	1892
		<i>El Paso.</i>	
		Michels, John Barnhart.	1909
		<i>Evanston.</i>	
		Benedict, Philip Vincent.	1908
		Lee, John Victor.	1910
		Mills, George P.	1907
		<i>Fairmount.</i>	
		Tilton, Claude Enoch.	1905

Fort Sheridan.

Riess, Herman William1903

Freeport.

McNess, Frederick William1906

Geneseo.

Stamm, Dante Milton1896

Girard, Macoupin Co.

Deck, Lewis Cass.....1901

Grayville.

Madden, St. Clair.....1909

Greenup.

Conzet, Rufus Warren.....1904

Hawthorne.

Wicarius, Max John.....1908

Herrin.

Hindman, Finis1910

Joliet.

Fahrner, Alphonse Anthony.....1906

Moline.

Lindvall, Charles Gustaf.....1897

Sohrbeck, George Henry1888

Sohrbeck, George William.... ..1897

Mount Vernon.

Morse, Edward Worth1896

Oak Park.

Foster, Frank Homer1908

McCauley, Charles Edward.....1903

Ottawa.

Duncan, William Dexter.....1909

Pekin.

Ehrlicher, Henry Michael.....1892

Peoria.

Benton, Wilber Merritt.....1888

Lueder, Fritz1894

Shpisman, Charles1909

Pesotum.

Hoffman, George Frederick.....1902

Polo.

Clothier, Charles Roland1905

Quincy.

Dickhut, Lawrence August.....1910

Eisele, George1908

Hageman, William Herman1910

Heidbreder, Albert Henry.....1905

Mueller, John Fred.....1910

Rock Island.

Hartz, William Theodore.....1909

Lindstrom, Reuben L.1910

Riess, Adolph John.....1909

Rockford.

Freburg, Amel E.....1910

Springfield.

Dodds, Richard Newton.....1902

Stronghurst, Henderson Co.

Harter, Isaac Foster.....1893

Tuscola.

Stacy, Marion Franklin.....1903

INDIANA.

Angola.

Sherrard, Charles Cornell1893

Bluffton.

Stout, Marion Alphon.....1906

Columbus.

Otto, Theodor Gotthelf Edward... ..1900

Stahlhuth, Ernst Heinrich Wilhelm ..1887

Evansville.

Bohn, George W.....1907

Petersheim, John Frederick.....1907

Farmersburg.

Barbre, Jno. V., Jr.....1910

Fort Wayne.

Emanuel, Julia Ester.....1906

Gross, William Otto.....1901

Mertz, Edward Leander.....1904

Woodworth, Benjamin Studley.....1906

Indianapolis.

Bibbins, Francis Eugene.....1909

Blodau, Robert P.....1908

Carter, Frank Henry.....1891

Carter, Harlen Wilson.....1908

Coons, William I.....1906

Eberhardt, Ernest Godlove..1906

Eckler, Charles Ralph.....1903
 Eldred, Frank Randall.....1905
 Ferger, Edward.....1906
 Francis, J. Richard.....1906
 Hereth, Franklin Samuel.....1893
 Huder, Henry J.....1894
 Hurty, John Newall.....1882
 Kassulke, August.....1905
 Keene, Jerome J.....1910
 Lilly, Eli.....1906
 Lilly, Josiah Kirby.....1890
 Lynn, Charles Jackson.....1906
 Mueller, J. George.....1906
 Pfaffin, Henry Adolph.....1892
 Schopp, Otto.....1906
 Schwartz, Maurice Paul.....1906
 Stuart, Ernest Eugene.....1906
 Stucky, Edward W.....1908
 Thorburn, Albert David.....1902
 Waddell, Minor T.....1899
 Walker, William Arthur.....1905
 Watkins, Charles Williams.....1907
 Werner, William F.....1908
 Zimmer, Harry Edgar.....1908

Kents.

Benkie, John Gottlieb.....1910

Lafayette.

Jordon, Charles B.....1909
 Schultz, John Jacob.....1904
 Sturmer, Julius William.....1901

La Porte.

Meissner, Frederick William, Jr.....1890

Logansport.

Hoffman, George L.....1906
 Hoffman, George William.....1904
 Porter, William Hamlin.....1906

Mt. Vernon.

Fogas, William Henry.....1907

New Albany.

Knoefel, Bruno.....1896
 Knoefel, Charles Deitrick.....1894

New Carlisle.

Warner, Francis Delop.....1904

Notre Dame.

Green, Robert Lee.....1906

Rockport.

Basye, Taylor Colman.....1909

Salem.

Rudder, William Hiram.....1907

Seymour.

Loertz, Carl Edward.....1907

Sheridan.

Elliott, Cassius E.....1910

South Bend

Bastian, Otto Carl.....1903
 Coonley, Charles.....1902
 Kuss, Ralph Henry.....1911
 Meyer, Martin Monroe.....1897
 Reyer, Emil.....1907

Terre Haute

Cassaday, Burton.....1909

Troy.

Gaesser, Theobald Theodore.....1901

Valparaiso.

Heineman, Albert F.....1905
 Linton, Arthur Wilson.....1910
 Roe, Joseph Newton.....1902
 Timmons, George Demming.....1905

Warren.

Hickerson, William Henry.....1894

Winchester.

Sala, Albert Franklin.....1905

*IOWA.**Amana.*

Kock, August Frank.....1903
 Schadt, Conrad.....1903

Boone.

Ridgway, Lemuel Augustus.....1882

Callender.

Larson, Martin.....1906

Cedar Rapids.

Boyson, George H.....1908

Charles City.

Legel, John Gotthelf.....1897

Clear Lake.

Etzel, John Leonhardt.....1897

<i>Clinton.</i>		Soper, George M.....	1909
John, Jesse Milo	1910	Thelander, Creston Carlos	1902
<i>Davenport.</i>		<i>Stuart.</i>	
Ballard, John Winthrop	1871	Treat, Joseph Augustus.....	1885
<i>Des Moines.</i>		<i>Waterloo.</i>	
Berner, Carl Albert	1903	Coontz, Floyd	1909
Macy, Sherman Riley	1891	<i>Winfield, Henry Co..</i>	
<i>Dubuque.</i>		Lindly, John Milton	1901
Wittmer, Joseph Washington.....	1896	KANSAS.	
<i>Fort Dodge.</i>		<i>Abilene.</i>	
Oleson, Olaf Martin	1877	Gleissner, Bruce Northcraft	1910
<i>Fort Madison.</i>		<i>Atchison.</i>	
Schafer, George Henry	1871	Myers, Carvosso Oursler.....	1904
<i>Homestead.</i>		Noll, Mathias	1901
Miller, Frederick William	1902	<i>Chanute.</i>	
<i>Hull.</i>		Brown, Chase W.	1910
Coad, William A.....	1911	<i>Ellis.</i>	
<i>Iowa City.</i>		Cave, William	1910
Boerner, Emil Louis	1877	<i>Ellsworth.</i>	
Cooper, Zada Mary	1909	Sherriff, William Ebenezer.....	1904
Teeters, Wilber John	1902	<i>Glasco.</i>	
<i>Keokuk.</i>		Brierley, John H....	1910
Kiedaisch, George Arthur	1904	<i>Gypsum City, Saline Co.</i>	
<i>Muquoketa.</i>		Schmitter, Jonathan	1892
Nitzsche, John Charles	1909	<i>Haltom.</i>	
<i>Marshalltown.</i>		Naylor, William W.....	1910
Mayer, Peter	1906	<i>Lansing.</i>	
<i>Muscatine.</i>		Shudrowitz, Frank Stanislas.....	1904
Halstead, Alice Louisa (Mrs.)	1892	<i>Larned.</i>	
Springer, Harry Hloopes.....	1911	Duncan, George Howard	1908
<i>New Hampton.</i>		<i>Lawrence.</i>	
Sayers, Milton Cary.....	1906	Emerson, Herbert William.....	1909
<i>Pocahontas.</i>		Havenhill, L. D.....	1900
Grover, Robert Oswald.	1908	Leis, George	1869
<i>Shenandoah.</i>		Moore, John Thomas	1883
Eaton, Harry F.....	1909	Sayre, Lucius Elmer.....	1883
<i>Sioux City.</i>		Watson, George Nathaniel.....	1910
Andreen, Carl.....	1902	<i>Miltonvale.</i>	
Koelle, Otto Charles.....	1902	Fleming, John S.....	1910
Moore, Silas Harwood	1880	<i>Marysville.</i>	
Scherling, Gustav	1884	Riesen, David V.....	1909

<p><i>Newton.</i></p> <p>Kates, George W. ....1910</p> <p><i>Ottawa.</i></p> <p>Becker, Charles Lewis .....1892</p> <p><i>Overbrook.</i></p> <p>Topping, Arthur Ellsworth.....1904</p> <p><i>Pittsburg.</i></p> <p>Lowman, Robert .....1910</p> <p><i>Salina.</i></p> <p>Eckstand, Francis W.....1910</p> <p><i>Scandia.</i></p> <p>Nywall, David A.....1910</p> <p><i>St. Francis.</i></p> <p>Dunn, George E.....1910</p> <p><i>Topeka.</i></p> <p>Holliday, Francis Emlen .....1900</p> <p><i>Wichita.</i></p> <p>Chism, John Samuel .....1909</p> <p>Frazier, William John.....1909</p> <p><i>Winfield.</i></p> <p>Bird, Richard B. ....1910</p> <p>Friedenburg, Maximilian Wilmer ....1904</p>	<p><i>Lexington.</i></p> <p>Brown, Linwood Arnold.....1909</p> <p>Cassell, Robert Lee.....1910</p> <p>Cooper, James Evans .....1907</p> <p>Harting, Rudolph R. ....1902</p> <p><i>Louisville.</i></p> <p>Buschemeyer, Henry, Jr.....1900</p> <p>Curry, Gordon Laten .....1900</p> <p>Diehl, Conrad Lewis .....1863</p> <p>Dilly, Oscar Charles .....1888</p> <p>Dimmitt, Addison .....1895</p> <p>Hurley, Horace Oliver .....1907</p> <p>Jones, Simon Newton .....1870</p> <p>Krul, John George .....1907</p> <p>Mueller, Otto Edward.....1907</p> <p>Newman, George Abner .....1866</p> <p>Overstreet, William Payne .....1893</p> <p>Overton, Burr Martin ....1903</p> <p>Peter, Minor Cary .....1894</p> <p>Schlosser, Peter .....1902</p> <p>Schoettlin, Albert John .....1882</p> <p>Treber, Frederick William .....1907</p> <p>Troxler, Constantine, Jr.....1896</p> <p>Votteler, William .....1895</p> <p>Weiss, William J.....1910</p> <p><i>Marion.</i></p> <p>Orme, James Houston.....1908</p>
<p>KENTUCKY.</p> <p><i>Ashland.</i></p> <p>Lordier, Charles Joseph .....1907</p> <p><i>Bowling Green.</i></p> <p>Wilson, George Thomas.....1907</p> <p><i>Covington.</i></p> <p>Pieck, Edward Ludwig.....1887</p> <p><i>Frankfort.</i></p> <p>Gayle, John William .....1891</p> <p><i>Hawesville.</i></p> <p>Patterson, George Orville.....1907</p> <p><i>Henderson.</i></p> <p>Elam, John Thomas .....1907</p> <p><i>Hopkinsville.</i></p> <p>Cook, James Otey .....1907</p>	<p><i>Mt. Sterling.</i></p> <p>White, Robin Hope.....1907</p> <p><i>Newport.</i></p> <p>Bange, Otto Franz .....1904</p> <p>Greule, Albert Martin .....1903</p> <p>Widrig, Louis Cornelius .....1910</p> <p><i>Paris.</i></p> <p>Clarke, Charles Jordan .....1904</p> <p><i>Shelbyville.</i></p> <p>Smith, Lemuel Grant .....1909</p> <p><i>Upton.</i></p> <p>Turner, Edgar Ray .....1900</p> <p><i>Winchester.</i></p> <p>Martin, James Henderson .....1908</p>

LOUISIANA.

Alexandria.

Siess, Leo Chester 1909

Monroe.

Allen, William Everett 1909

Natchitoches.

McChury, E. L. 1910

New Orleans.

Adams, James Ogilvie 1904

Angell, James Richard 1909

Armen, Charles 1910

Asher, Philip 1905

Baltar, Joseph Thomas 1909

Berlin, Henry 1909

Breslin, Michael Thomas 1905

Brown, George Stewart 1900

Capdau, Pierre August 1902

Claren, George Victor 1909

Conn, Moise Clarence... .. 1909

Dannenmann, Edward 1909

Di Trapani, Anthony 1909

Earhart, Frederick A 1904

Finlay, Alexander Kirkwood 1883

Godbold, Fabius Chapman 1887

Grasser, John J. 1909

Guidry, Ambrose Joseph 1903

Harter, William E. 1910

Henriques, Adolph 1909

Humphreys, George H. 1910

Kaczoroski, Adolph O. 1909

Legendre, Joseph Amilcar 1891

Levy, William Michael 1894

Lobenhoffer, Philip 1909

Lyons, Lucien Eugene 1904

McDuff, George Washington... .. 1910

Metz, Abraham Lewis 1887

Miller, Charles 1897

Samson, Max 1900

Sauvinet, Charles Daniel 1902

Villere, Rene Louis 1905

Walker, Joseph Patrick 1909

Walsdorf, Edward H. 1904

Weilbaecher, Frank Eugene 1904

Wirth, Adam 1904

Wunderlich, Edward 1891

Quarantine.

Holt, Edwin Merrimon 1902

Shreveport.

Spencer, James Woodburn 1908

Vivian.

Wingo, Daniel W. 1909

MAINE.

Auburn.

Burnham, Ralph Foster 1904

Jones, Oscar Winthrop. 1902

Ryder, Horace Foster 1907

Augusta.

Coughlin, John 1908

Partridge, Frank Reuben 1895

Bangor.

Davis, Charles Howard 1903

Sweet, Caldwell 1881

Biddeford.

Boynton, Herschel 1875

Traynor, Charles Francis 1902

Brunswick.

Wilson, Frederick Henry 1906

Castine.

Walker, William Ayer 1910

Danforth.

Porter, Martin Luther 1904

Deer Isle.

Saunders, William Houston 1910

Fort Fairfield.

Buxton, Horace Childs 1910

Fort Kent.

Burrill, Stanley 1910

Gardiner.

Ames, Wilmot S. 1910

Beane, Chester Hunnewill 1909

Gorham.

Carswell, Edgar Forrest 1910

Houlton.

Ormsby, Herbert 1909

Kennebunk.

Meserve, Albert Wealey 1905

Lewiston.

Babcock, Percival Warren 1909

Baribault, Edward Samuel 1910

Lowell, Edward Mark 1896

<i>Machias.</i>		DeReeves, Antonio Eugene.	1909
Crane, Frank Trussell.....	1910	Dickson, Frederick W.	1906
<i>Orono.</i>		Dohme, Alfred Robert Louis.....	1891
Jackman, Wilbur Fisk.....	1899	Dohme, Charles Emile	1863
<i>Portland.</i>		Downes, Edwin Richards.	1907
Bierman, Clarence Henry.....	1908	Dunning, Henry Armit Brown	1902
Cook, Alfred Page.....	1902	Elliott, Henry Alexander	1859
Frye, George Carlton	1879	Engelhardt, Hermann.....	1907
Hay, Edward Allston	1889	Feick, Charles	1901
Morse, Frank Dana.....	1902	Fouch, William M.	1906
Perkins, Benjamin Abbott	1878	Frailley, Carson Peter.....	1908
Rand, Daniel Moulton	1892	Frames, John Fuller.....	1890
Schlotterbeck, Augustus George	1896	Gilpin, Henry Brooke.....	1889
Tuttle, George O.....	1907	Hancock, James Etchberger	1907
<i>Saco.</i>		Hancock, John Francis	1863
Sawyer, Charles Henry	1896	Hengst, John Edwin.....	1900
<i>Sanford.</i>		Hess, Nicholas Alphonso.	1908
Wood, William Henry	1910	Heuissler, Philip Ignatius.....	1903
<i>Skowhegan.</i>		Hill, Aubrey Thomas	1907
Bucknam, Frank William.....	1907	Hodson, Eugene Withers.	1907
<i>Waterville.</i>		Hynson, Henry Parr.	1890
Vose, George Ellery.....	1910	Kelly, Evander Frank.....	1905
<i>Wilton.</i>		Kelly, Thomas	1907
Parlin, Ernest Parkhurst.....	1910	Lowry, William John, Jr.	1906
<i>York Village.</i>		Maisch, Henry.....	1898
Sanford, John Foy.....	1902	Mansfield, Samuel.	1898
MARYLAND.		Meyer, Adolph Carl.....	1905
<i>Annapolis.</i>		Meyer, Charles Lewis	1901
Henkel, Charles Bernard	1902	Millard, David Rockwell.....	1899
<i>Arlington.</i>		Morgan, Charles	1899
Roberts, Joseph C.....	1910	Muth, George Giustiniani.	1906
<i>Baltimore.</i>		Muth, John Clement	1898
Bacon, Ephraim.....	1905	Muth, John Sebastian.....	1898
Baily, George Frank	1906	Neal, Charles Chaplin.....	1906
Barnett, Joel Jones	1899	Neubauer, Clarence George	1910
Base, Daniel	1898	Schimmel, Maurice Solon.	1900
Black, James Aitken	1910	Schulman, Jacob A.....	1910
Brack, Charles Emil	1876	Schulze, Louis	1892
Burrough, Horace, Jr.....	1901	Schumann, Otto George	1902
Caspari, Charles, Jr.....	1883	Smith, Theodric.	1890
Cook, Parker.....	1910	Sonnenburg, Charles Edward.....	1909
Culbreth, David Marvel Reynolds.....	1883	Stichel, William Kleinheim.	1907
Daneker, Howard Nelson	1907	Sullivan, John Patrick.....	1909
Davis, John Alexander.....	1894	Thomas, John Benjamin.....	1906
		Thomas, John Benjamin, Jr.	1910
		Thomas, Oscar Bernard	1907
		Walz, Jacob Lee	1906
		Ware, Charles Howard	1898
		Werckshagen, Otto	1907
		Westcott, James Walling	1890
		Whittle, William Aloysius	1908
		Wich, Henry Edward	1909

Williams, Lawrence Soper	1910	Burnham, Alfred Augustus, Jr.	1891
Williamson, Robert Edward Lee	1898	Burroughs, George R.	1910
Winkelman, John Henry	1864	Cabitt, Harry	1909
Winslow, Edwards Fayssoux	1910	Carter, Frederick Louis	1905
Wolf, Charles Augustine	1906	<i>Colton, James Byers.</i>	1865
Wolf, James Carlton.	1905	Connelly, Fred. William	1907
Wolf, Michael Francis	1906	Connoly, Francis Joseph	1910
Woltereck, Gustav.	1909	Conner, William	1911
<i>Brookeville.</i>		Cramer, Max.	1881
Howard, Henry.	1905	Dexheimer, Bertram Allison	1910
<i>Catonsville.</i>		Doherty, William H.	1909
Simon, William	1885	<i>Dolber, Thomas</i>	1859
<i>Chestertown.</i>		Drury, Linus Dana	1871
Stam, Donald Ferguson ...	1910	Ernst, Frank Frederick	1910
Toulson, Milbourne Asbury	1905	Finneran, James Francis	1906
<i>Frederick.</i>		Gammon, Irving Parker	1906
Pearcé, Albert Lindsay	1906	Gerald, Herbert Franklin	1906
<i>Hagerstown.</i>		Godding, John Granville	1875
Meredith, Harry Lionel	1900	Goodwin, Howard	1910
<i>Relay, Baltimore Co.</i>		Griffin, Lyman Whiting	1907
Hindes, Joseph Frey.	1910	Hagar, Goodwin C.	1910
<i>Snow Hill.</i>		Hitchcock, Charles H.	1910
Powell, William Cottingham	1895	Lalor, James Hugh	1908
<i>Sykesville.</i>		Lyons, Michael Francis	1911
Swain, Robert Lee	1909	Marshall, Ernst C.	1910
<i>Taneytown.</i>		McIntire, Martin J.	1910
McKinney, Robert Sentman	1898	O'Brien, James M.	1910
MASSACHUSETTS.		Owen, Fred. S.	1911
<i>Amherst.</i>		Pierce, William Herbert	1879
Deuel, C. Fred.	1907	Sawyer, John R.	1908
<i>Andover.</i>		Sawyer, William Frederick	1885
Allen, William Annett	1909	Sharpless, Stephen Paschell	1875
Stacey, Franklin Horton	1910	Sheppard, Samuel Arus Darlington	1865
<i>Arlington.</i>		Thompson, Leon Albert	1907
Murphy, Robert William	1911	Thornton, Henry.	1910
<i>Beverly.</i>		Vargas-Heredia, Jorge	1891
Delaney, Thomas F.	1910	West, Charles Alfred	1892
<i>Boston.</i>		Wiggin, Harry C.	1910
Ackerman, Adolph Henry	1910	Williams, George Gorham	1888
Baird, Julian William	1894	Wilson, Benjamin Osgood	1859
Baker, Walter Nelson	1906	Wolff, Daniel Oliver	1909
Bassett, Charles Harrison	1867	<i>Brighton.</i>	
Blake, Hany Wilmarth	1909	Towse, Clarence W.	1911
		<i>Brockton.</i>	
		Randall, Frank Otis	1893
		Swift, Charles Nelson	1910
		Wicker, J. A.	1911
		<i>Brookline.</i>	
		Clapp, Lowell Tuckerman	1905
		Mason, John G.	1911

Cambridge.

Acheson, William L.....1910
 Hawthorne, Herman Francis.....1909
 LaPierre, Elie Henry.....1892
 McCormick, Peter Joseph.....1909
 Norton, George Edward.....1895
 Phillips, Carrie Elizabeth.....1894
 Seaverns, Martha Gilbert.....1902
 Stover, Charles Albert.....1909

Chelsea.

Berkowitz, Morris Emanuel.....1910

Concord.

Richardson, Horatio Stillman.....1892

Dorchester.

Altman, Richard M.....1910
 Cullinen, Katherine M.....1910

Dorchester Centre.

Davis, Charles Henry.....1907
 Tripp, Arthur Horton.....1906

East Boston.

Kinnier, Patrick J.....1910
 Packard, Charles Herbert.....1906
 Woodbury, Frank A.....1910

Everett.

Wagner, Arthur Carl.....1907

Fall River.

Brunelle, Albert Joseph.....1910
 Riddell, Benjamin Franklin.....1892

Fitchburg.

Coté, André Alexandre.....1904
 Estabrook, Henry Arthur.....1886

Groton.

Bruce, Harry L.....1910

Holyoke.

Heinritz, Lebrecht Gustav.....1902

Hudson.

Toohy, Matthew Frederick1911
 Wheeler, Carlton Bancroft.....1907

Jamaica Plain.

Lewis, Ernest Grant.....1892
 Smith, Linville Holton1892

Lawrence.

Bower, Edward A.....1907
 Call, Harry Barrett.....1909
 Dubrule, Rosaire.....1909
 Forrest, John James.....1909
 Glover, William Henry.....1891
 Smith, Albert Burnham.....1907

Leominster.

Nixon, Charles Frederic.....1900

Lowell.

Bailey, Frederick1869
 Donaghue, Richard Sheridan.....1910
 Hood, Charles Ira1871
 Wilson, George Arnold.....1906

Ludlow.

Booth, Albert Edward.....1907

Malden.

Whitaker, William H.....1910

Marlboro.

Barnard, Harry Ames.....1907
 Gorman, Mary Cecilia.....1907

Melrose.

Ripley, Henry M.....1910

New Bedford.

Blake, James Edwin1866
 Shurtleff, Israel Hammond1875

Newburyport.

Davis, Charles Leland.....1897
 Goodwin, William Wells.....1853

Newton.

Hubbard, Frederick Arthur1907
 Hudson, Arthur.....1882
 Woodman, Walter Irving.....1893

Newton Center.

Hahn, William.....1910
 Hassett, Thomas Bernard.....1907

Newton Highlands.

Waterhouse, Joseph T.....1910

Newton Lower Falls.

Sears, Carrie L.....1910

Newtonsville.

Payne, John Francis.....1910

North Cambridge.

Olive, Geo. M.1911

Pittsfield.

Bence, Eli1910

Engstrom, Ernst Oscar.....1906

Plymouth.

Cooper, James W.....1909

Provincetown.

Hurlbert, William Alexander.....1909

Raynham.

Crossman, George Alvin1872

Roxbury.

Kelley, Gustavus A.....1910

Sagamore.

Adams, James Holmes1906

Salem.

Nichols, Thomas Boyden1876

Sharon.

Wheeler, William Dexter.....1892

Shelburne Falls.

BaKer, Edwin.....1875

Somerville.

Bean, James Arthur.....1910

Grover, George E.....1910

Perry, Henry William.....1910

Southborough.

Newton, Robert Albro1906

Springfield.

Leonard, Edward Fenno.....1909

Stoneham.

Emerson, Herman Lincoln1911

Patch, Edgar Leonard1872

Taunton.

Ripley, Charles F.....1910

Vineyard Haven.

Cannon, Claude Clabourne.....1910

Waltham.

Gleason, Patrick Sebastian....1904

Hudson, John Robert.....1910

Wellesley.

Fitzpatrick, Patrick Joseph1908

West Medford.

Shedd, Edwin W.1910

West Roxbury.

Summer, Jennie Henrietta1909

West Somerville.

Furbush, Willis S.....1910

Winchester.

Knight, Frank Herbert.....1909

Worcester.

Brewer, Howard Dickinson1902

Flint, William S.....1909

Guerin, James Francis1898

Hadley, John Howe Conant1910

Scott, George Theodore1883

MICHIGAN.

Ann Arbor.

Calkins, Eleazer E.....1903

Eberbach, Ottmar1869

Schlotterbeck, Julius Otto1888

Stevens, Alviso Burdette1885

Battle Creek.

Goodale, Martin H1910

Berrien Springs.

Kephart, Philip1902

Birmingham.

Cobb, James W.....1909

Coldwater.

Lyon, Arthur George1909

Detroit.

Averyt, Henry Madison1907

Francis, John Miller1906

Gorenflo, Oscar William1909

Gratton, George Frederick.....1909

Graber, Howard Tyler1910

Hall, William Alanson1888

Helfman, Joseph1894

Houghton, Elijah Mark1889

Knox, James Wesley Thompson1898

Lyons, Albert Brown1885

Mallard, Albert E.....1907

Mann, Charles Frederick1903

Mason, Harry Beckwith.....	1896	<i>Traverse City.</i>	
McClure, Clarence Minor.....	1907	Bugbee, Charles Alpheus	1909
Meier, Arthur John.....	1910	Macdonal, Horace R.....	1910
Nelson, Edwin Horatio	1904	<i>Ypsilanti.</i>	
Ohliger, Louis Philip	1871	Seymour, James	1903
Ohliger, Willard.....	1903	MINNESOTA.	
Perry, Frederick William Riley.....	1885	<i>Alexandria.</i>	
Ryan, Frank Gibbs	1892	Holverson, Henry T.....	1909
Schulz, Henry Louis	1905	<i>Anoka.</i>	
Scott, William C. M.....	1909	Goodrich, George Herbert.....	1909
Scoville, Wilbur Lincoln	1891	<i>Duluth.</i>	
Seltzer, Leonard Adams.....	1899	Abbett, William Allen.....	1901
Stevens, Grant W.....	1910	LeRicheux, Alfred Charles	1901
Thompson, Frank Augustus.....	1908	<i>East Grand Forks.</i>	
Vernor, James	1866	Kingman, Ignatius	1904
Weaver, Clarence Albert	1909	<i>Fergus Falls.</i>	
Wheeler, Albert Alton	1906	Biese, John Henry	1908
<i>Flushing.</i>		<i>Hopkins.</i>	
Sprague, Wesson Gage	1895	Souba, Emil George.....	1911
<i>Grand Rapids.</i>		<i>Jackson.</i>	
Jongejan, Cornelius Henry.....	1910	Colby, Charles Ludwig	1904
Kirchgessner, William Carl	1903	<i>Kennedy.</i>	
Muir, John Davidson.....	1903	Arneson, Thomas	1906
<i>Ionia.</i>		<i>Lindstrom.</i>	
Gundrum, George	1882	Elfstrand, Wilhelm	1905
<i>Iron Mountain.</i>		<i>Mankato.</i>	
Seibert, George Frederick	1909	Lamm, Edward Leo	1906
<i>Kalamazoo.</i>		Thomas, Frank George.....	1909
Todd, Albert May	1885	Weed, Nelson	1905
<i>Lansing.</i>		<i>Minneapolis.</i>	
Holm, Marinus Larsen.....	1905	Allen, E. Floyd.....	1885
Jones, Mervin Aldrich.....	1909	Bachman, Gustav.....	1905
Shannon, Fern L.....	1910	Brownlee, Sherman Harry	1909
<i>Monroe.</i>		Butters, Charles Hayes	1907
Hagans, Daniel Allen.....	1903	Danek, John Francis	1895
<i>Petoskey.</i>		Erkel, Arthur George	1910
Atkins, Charles Wesley.....	1908	Errickson, William Alexander	1909
<i>Pontiac.</i>		Gamble, Stewart	1897
Leisenring, Willis	1909	Griffen, Truman	1909
<i>Port Huron.</i>		Harrah, John William.....	1910
Rodgers, Edward James	1909	Huhn, Charles Hugo.....	1905
<i>Saginaw.</i>		King, George Alexander Newton	1892
Heim, Henry	1900	Klemert, Frederick Alois	1910
Prall, Delbert Elwyn.....	1902	Kulp, George Henry	1910
		Newcomb, Edwin Leigh.....	1906

Reum, Arthur William1910
 Stuart, Josephine A. Wanous1897
 Sweet, William Herbert1905
 Thompson, Albert Delano1895
 Wittich, Matthew Henry1897
 Wulling, Frederick John.....1893

New Utm.

Eckstein, Andrew Joseph1895

Ortonville.

Nielson, John1897

Pelican Rapids, Otter Tail Co.

Axness, Ole Mikkelsen1895

Sleepy Eye.

Keller, Alfred Joseph1909

St. Paul.

Campbell, Albert Alexander1902
 Clough, Charles Foster1909
 Collier, William Kelly.....1897
 Conger, Frederic Albert1907
 Frost, William Arthur.....1892
 Goodsell, Willard R.....1909
 Heller, Charles Tomkins.....1906
 Jehneke, John Peter1907
 McCall, Henry.....1910
 Noyes, Charles Reinold1908
 Parker, Frederick M.....1902
 Rietzke, Herman W.....1909
 Smith, Frederick Alfred Upsher.....1907
 Westby, Severs.....1907

Winona.

Leeb, Theodore Feargod.....1903
 Rohr, Arthur von.....1908
 Rose, Edward Spangler1909

Worthington.

Morland, Robert Lawson1909

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckfork, Joseph William.....1883

Biloxi.

Stier, Carl.....1902
 Milligan, John Dean1900

Cruger.

Dodge, Murray Mitchell.....1909

Ellisville.

Ward, Enoch James.....1905

Forest.

Vance, Winfield Scott.....1909

Heidelberg.

Lee, Irma Undine1909

Kosciusko.

Hammond, William Jesse, Jr.....1908

Meridian.

Bethea, Oscar Walter.....1902

Osyka.

Coody, Archibale Stinson.....1906

Port Gibson.

Shreve, John Alexander1880

University.

Faser, Henry Minor1910

MISSOURI.

Boonville.

Kurtz, Irving William.....1904
 Mittlebach, William.....1891

Carrollton.

Pettit, Henry McEwen1860

Centralia.

Hope, Robert Lee.....1901

Columbia.

Tilley, Robert Bruce1909

Gorin.

Estell, Holice1910

Hannibal.

Ayres, Albert John1907

Jefferson City.

Brandenberger, Adolph.....1894

Kansas City.

Amos, Wilbur Stanton.....1908
 Baker, De Forest.....1908
 Crampton, Ferd Leslie1896
 Faxon, Henry D1909
 Federman, William Martin.....1901
 Hess, Paul Ludwig1892
 Hogan, John M.....1909
 Lee, Richard Henry1904
 Whitney, David Victory1903
 Wirthman, John George.....1903

Wirthman, Joseph Charles.....1903
Zinn, Charles Edward.....1909

Linn Creek.

Moulder, Bettie Leona.....1905

Marysville.

Orear, Edwin George.....1904

Mexico, Audrian Co.

Llewellyn, John Frederick.....1867

Llewellyn, Frederick William.....1908

Nevada.

Ballagh, Wilfred Thomas.....1901

New Madrid.

Hummel, John Andrew.....1901

Sedalia.

Bard, William Evans.....1901

Servant, Harry W.....1910

Smith, Otis Wilmer.....1903

St. Joseph.

Bender, Walter Comstock.....1909

Burvenich, Anton.....1909

St. Louis.

Blakeslee, Louis George.....1903

Boehm, Solomon.....1871

Buehler, Carl Theodore.....1910

Caspari, Charles Edward.....1902

Claus, Otto Ferdinand.....1901

Coussens, Bettie Prince.....1910

Duering, Henry Charles.....1901

Falk, John Charles.....1900

Fricke, Frederick Henry.....1901

Gietner, Charles.....1905

Good, James Michener.....1871

Grewe, Louis Frederick.....1901

Hagee, William Price.....1901

Hagenow, Theodore Frederick.....1901

Hahn, Charles William John Henry.....1901

Hanser, Otto Charles.....1910

Hemm, Francis.....1881

Horton, Charles Henry.....1905

Huegel, Henry Otto Andrew.....1909

Ilhardt, William Kellerman.....1901

Ittner, William Frederick.....1903

Judge, Charles Rogers.....1901

Klie, George Henry Charles.....1878

Lang, George, Jr.....1909

Lieberstein, Louis.....1909

Mallinckrodt, Edward.....1869

May, Charles Charlotte.....1898

Merrell, George Robert.....1901

Merrell, Hubert Spencer, Jr.....1910

Meyer, Theodore Frederick.....1901

Morris, George A.....1908

Noll, Martin James.....1898

Pauley, Frank Charles.....1879

Reilly, Robert Charles.....1901

Sander, Enno.....1858

Scheffer, Henry William.....1863

Schlueter, Robert Ernst.....1904

Schoenthaler, John Paul.....1901

Seitz, Lorenz Aloysius.....1901

Sennewald, Emil August.....1900

Stolle, Henry Jasper.....1903

Sultan, Frederick William.....1901

Suppan, Leo Richard August.....1904

Uhlich, Ferdinand Gottlieb.....1881

Vordick, August Henry.....1874

Walbridge, Cyrus Packard.....1901

Wall, Otto Augustus.....1884

Welsh, Joseph Bruner.....1910

Whelpley, Henry Milton.....1887

Wolff, Edward Henry.....1901

Webster Groves, St. Louis Co.

Mueller, Ambrose.....1894

Windsor, Henry Co.

Wesner, Henry Clay.....1901

MONTANA.

Billings.

Kehoe, Thomas M.....1910

Warren, Lee.....1907

Bozeman.

Mollet, Charles Edwin Francis.....1909

Trent, William Walter.....1910

Butte.

Rockefeller, Howard.....1900

Great Falls.

Woehner, Frederick A.....1909

Helena.

Spater, William Charles.....1905

Livingston.

Scheuber, Frank Augustus.....1905

Missoula.

Bateman, Herbert Howard.....1909

Coffee, Sidney J.....1909

NEBRASKA.

Adams.

Killen, Daniel J.....1909

Arlington.

Weber, Don Caesar1908

Auburn.

Dort, Edward Harvey.....1903

Fairbury.

Pease, Autumn Vine.....1893

Fremont.

Koss, Frank1907

Kreizinger, Carl Ludwig.....1907

Grand Island.

Baumann, Oscar.....1908

Greeley.

Clough, Frank Harrington.....1905

Holbrook.

Butler, Guy.....1909

Holdrege.

Fink, Daniel Jacob1903

Kenesaw.

Mikkelsen, Niels1903

Lincoln.

Bradshaw, Arthur M.....1910

Haschenburger, Edmund Ommen1907

Lyman, Rufus Ashley1908

Louisville.

Frater, George1909

McCook.

McConnell, Lewis William.....1904

Merna.

Gordon, Arthur O.....1910

Norfolk.

Christoph, George Benjamin.....1910

North Loup.

Smith, George C1910

Omaha.

Bexten, Edward William.....1908

Cermack, Emil.....1908

Fricke, Charles B.....1909

Lane, Harvey C.....1910

Lathrop, Charles E.....1910

Mares, Ferdinand Louis.....1897

Myers, Preston Brown.....1897

Sherman, Charles Rollin.....1889

Thorpe, Edmund1908

Pender.

Tucker, Edward J.....1910

Plattsmouth.

Fricke, Frederick George.....1903

Gering, Henry R.....1907

Stella.

McBride, James G.....1909

Sterling.

Heilman, Belle Caricita1909

Tekamah.

Kokes, Anton Rudolph.....1910

Wilber.

Simerka, Joseph Albin.....1910

Wynot.

Schulte, Alexander, Jr.....1908

NEVADA.

Tonopah.

Piercy, Joseph Clifton.....1908

Winnemucca.

Brown, William A.....1909

NEW HAMPSHIRE.

Berlin.

Lyford, Earle Howard1903

Groveton.

Campbell, Albert Ernest.....1911

Hillsboro.

Moxley, Roland Rufus.....1907

Manchester.

Knowlton, George Harry1907

Nashua.

Blanchard, W. H.....1910

Rice, Herbert Eugene.....1910

Portsmouth.

Grace, William Day.....1896

Green, Benjamin1888

<i>Somersworth.</i>	<i>Ironia.</i>
Hurd, John Charles.....1892	Coleman, John H.....1902
NEW JERSEY.	<i>Jersey City.</i>
<i>Atlantic City.</i>	Gallagher, John Charles.....1893
Deakayne, Harry Hartup.....1905	Lane, John Joseph.....1909
<i>Bernardsville.</i>	Lohmann, Herman J.....1896
Squibb, Charles Fellows.....1901	<i>Jersey City Heights.</i>
<i>Bridgeton.</i>	Bongartz, Ferdinand Alphonse.....1905
Dare, Charles Ford.....1889	Foulke, James.....1881
Jorden, Henry Albert.....1902	Kuehne, Charles.....1902
<i>Burlington.</i>	<i>Kearney.</i>
Sparks, Edgar Reed.....1909	Shaak, Franklin Philip.....1906
<i>Camden.</i>	<i>Keyport.</i>
Barrett, Charles Llewellyn.....1902	Warn, William Edgar.....1886
Beringer, George Mahlon.....1893	<i>Maywood.</i>
Beringer, George Mahlon, Jr.....1905	Balmert, Clemens Augustus.....1909
Weiser, William Peiffer.....1902	<i>Medford.</i>
<i>Collingswood.</i>	Thorn, Henry Prickett.....1879
Vanderkleed, Charles Edwin.....1902	<i>Montclair.</i>
<i>Elizabeth.</i>	Wensch, Henry Ernest, Jr.....1902
Frohwein, Richard.....1867	<i>Morristown.</i>
Oliver, William Murray.....1875	Carrell, Eugene Ayres.....1875
Schmidt, Henry.....1904	<i>Mount Holly.</i>
Stutzlen, Frank Charles.....1902	Jones, Edward B.....1909
<i>Englewood.</i>	<i>Newark.</i>
Brown, Lewis W.....1907	Bear, Pierce B.....1905
<i>Fort Hancock.</i>	Foster, John Benjamin.....1901
Kauffman, Emmett Clarence.....1907	Hain, Frank William August.....1905
<i>Fort Lee.</i>	Holzhauser, Charles.....1873
Kaiser, Herman W.....1907	Holzhauser, Charles William.....1907
<i>Frenchtown.</i>	Lamar, William Robinson.....1901
Harman, Harry M.....1909	Marquier, Adolph F.....1909
<i>Glen Ridge.</i>	Menk, Charles William.....1898
Doolittle, Roscoe Edward.....1909	Rusby, Henry Hurd.....1890
<i>Hackensack.</i>	Sayre, Edward Augustus.....1877
Franck, Adolf.....1909	Scholz, Oscar Robert Bruno.....1909
<i>Haddonfield.</i>	Smith, Clarence Pennington.....1890
King, James David.....1910	Stanford, William Harrison.....1870
Willard, Rowland.....1902	Strauss, David.....1910
<i>Hoboken.</i>	Wuensch, Charles.....1898
Klussman, Hermann.....1876	<i>New Brunswick.</i>
	Kilmer, Frederick Barnett.....1886
	Rust, Schuyler Scott.....1905

Orange.

Behrens, John Frederick.....1908

Perth Amboy.

Parisen, George Warren.....1892

Seaman, Frederick Anthony.....1905

Phillipsburg.

Anewalt, Ellsworth Quincy.....1901

Plainfield.

Schreiner, Robert.....1906

Rahway.

Smith, Joseph George.....1909

Red Bank.

Van Derveer, Robert Hutchinson....1903

Riverside.

Hires, Lewis Moore.....1907

Sea Isle City.

Wendel, Henry Edward1873

South Amboy.

Jacques, George Washington1869

South Orange.

Feindt, Louis F.....1906

Tenafly.

Bower, Edwin Lawrence.....1909

Verona, Essex Co.

Rich, William Pitt.....1902

West Hoboken.

Maggio, James Innocenzo.....1907

Neu, Daniel Alfred.....1903

Taborelli, Ernest Thomas.....1907

Westfield.

Frutchey, George Watson.....1909

Woodstown.

Andrews, George Mason.....1909

NEW MEXICO.

Albuquerque.

Ruppe, Bernard Charles.....1908

Fort Stanton.

Southard, Frank Allan.....1903

Las Vegas.

Murphey, E. G.....1909

Santa Fe.

Fischer, Adolph Jacob.....1910

Palmer, William Gordon.....1909

NEW YORK.

Albany.

Bradley, Theodore James.....1896

Bradt, Warren Lansing.....1903

Dillenback, Garet Van der Veer.....1902

Michaelis, Gustavus.....1882

Taylor, Henry Lewis.....1906

Auburn.

Adams, Arthur Ellison.....1902

Cantor, Harry Bernard.....1910

Sears, Charles Barager.....1906

Bayside, L. I.

Gregorius, William Paul.....1907

Brooklyn.

Anderson, William Christine.....1900

Bartley, Elias Hudson.....1893

Brundage, Albert Harrison.....1892

Cantor, Lorentz.....1907

DeJonge, Cornelius.....1899

Dewender, William Henry.....1896

Dichl, August.....1909

Dissosway, Thurston N.....1905

Dodge, Francis Despard.....1910

Duerr, George John.....1910

Dunn, John Augustus1867

Eccles, Robert Gibson.....1885

Fischer, Albert.....1904

Fougera, Edmund Charles Henry.1890

Gardner, Alexander.....1910

Hoburg, William August, Jr.....1909

Maisel, Joseph.....1908

May, Louis.....1902

McElhenie, Thomas DeArmond ..1872

McMahon, Joseph.....1897

Muir, William.....1907

Myerson, Isaac Aaron.....1906

Raubenheimer, Otto.....1902

Rosenzweig, Benjamin.....1898

Schaak, Milton Franklin.....1906

Schoenfeld, Samuel.....1910

Snyder, Ambrose Chancellor.....1867

Stenbuck, Moses Abraham.....1907

Tocco, Orazio.....1910

Tutbill, Frederic Percival.....1899

Wyckoff, Elmer Ellsworth.....1906

Buffalo.

Bentz, Henry George.....	1904
Dimond, Harry John.....	1904
Gregory, Willis George.....	1886
Hayes, Horace Phillips.....	1880
Lock, Frank E.....	1910
Lockie, Peter M.....	1911
Menzies, John William.....	1911
McEachren, Neil.....	1911
Reimann, George.....	1902
Roehrig, Albert Michael.....	1902
Stoddart, Thomas.....	1900
Whelan, William Farrar.....	1911

Cambridge.

Richardson, Frank.....	1906
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Catskill.

DuBois, William Laneman.....	1880
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College Point.

Hartz, Johann Daniel August.....	1902
Klein, Edward Nicholas Emil.....	1905

Corning.

Cole, Victor Le Roy.....	1880
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Dannemora.

Sloss, Robert Audley.....	1901
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Delmar.

Husted, Alfred Birch.....	1879
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Dunkirk.

Davis, Eugene Miller.....	1892
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Ellicottville.

Alexander, Glenn N.....	1910
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Ellis Island.

Macdowell, William Foster.....	1904
O'Gorman, Theophilus Vincent.....	1897

Elmira.

Holmes, Clayton Wood.....	1873
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Flushing.

Hepburn, John.....	1873
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Freeport.

Werner, Rudolph Carl.....	1882
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Hudson.

Wardle, Arthur Stanley.....	1910
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Kingston.

McBride, Charles Luther.....	1910
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Little Falls.

Hurley, John.....	1909
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Middleton.

Rogers, William Henry.....	1869
Shimer, Samuel Mortimer.....	1904

Monticello.

Isakovics, Alois von.....	1905
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Moravia.

Hawley, Ralph Wright.....	1908
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Mount Vernon.

Rauschenberg, Sidney.....	1900
Stone, Clarence George.....	1901

New York City.

Allison, William Outis.....	1895
Alpers, William Charles.....	1890
Andrews, William Augustus Peck.....	1908
Ballard, Charles William.....	1908
Balser, Gustavus.....	1875
Beilstein, Christian.....	1907
Berger, Louis.....	1907
Bigelow, Clarence Otis.....	1900
Billings, Henry Merry.....	1869
Boeddiker, Otto.....	1895
Brucker, Carl Friedrich Jacob.....	1902
Chandler, Charles Frederic.....	1867
Coblentz, Virgil.....	1882
Cohn, Alfred I.....	1905
Conyngham, William Boulton.....	1909
Cook, Thomas Penrose.....	1877
Cosby, Charles Reynolds.....	1909
Craig, Hugh.....	1907
Daggett, Volney Chapin.....	1901
Darling, Joshua Ferris.....	1909
Diamond, Peter.....	1905
Dickman, George Charles.....	1898
Diner, Jacob.....	1906
Duff, James C.....	1910
Ennis, Ephraim Leonard.....	1906
Erhart, William Hermann.....	1907
Evans, William J.....	1908
Fairchild, Benjamin Thomas.....	1875
Fairchild, Samuel William.....	1887
Ferguson, George Albert.....	1905
Flowers, Hiland.....	1904
Fraser, Horatio Nelson.....	1888
Gable, Ralph Benton.....	1902
Gane, Eustace Harold.....	1895
Geisler, Joseph Frank.....	1889

Goeckel, Henry Joseph	1908	Niece, Frederic Ellwood.....	1903
Goetting, Ernest C.	1909	Oats, Henry E.....	1911
Green, Edward T.....	1905	O'Neil, Henry Maurice.....	1879
Greenawalt, William Grant.....	1907	Pearson, Joseph Frederick.....	1897
Gregorius, George Gust. Chas. Wm. ..	1898	Plaut, Albert.....	1894
Haddad, Saleem Faris.....	1902	Quackinbush, Benjamin Franklin	1886
Hamann, William Augustus.....	1907	Ramsdell, Clifford	1907
Hatcher, Robert Anthony.....	1905	Ramsey, George.....	1907
Haynes, David Oliphant	1887	Ramsperger, Gustavus	1860
Hays, Francis Banks.....	1902	Riefflin, George T.	1909
Henning, Adolph.....	1905	Rippetoe, John Ross.....	1907
Heydenreich, Emile	1867	Robinson, William Josephus Marir...1902	
Hirseman, Felix.....	1907	Roediger, Louis Frank	1909
Hitchcock, George Henry	1902	Roenne, Paul Ludwig.....	1908
Hohmann, George.....	1910	Runyon, Edward Wheelock	1875
Hopkins, Jesse L.....	1898	Sahm, Louis Napoleon.....	1905
Hudnut, Richard Alexander	1899	Schenck, Henry.....	1903
Jungmann, Julius.....	1879	Schieffelin, William J.....	1892
Juster, Herman.....	1908	Schimpf, Henry William.....	1894
Kalish, Oscar G.	1900	Schmid, Henry.....	1887
Kantrowitz, Hugo.....	1907	Schnell, Harry Julius	1906
Keenan, Thomas John	1894	Schweinfurth, George Edward	1907
Kemp, Edward.....	1903	Scott, Harry.....	1907
Kennedy, Ezra Joseph	1887	Seil, Harvey A.....	1909
Kenney, Frederick James	1910	Sher, Edward	1910
Kirchgasser, William Charles.....	1888	Skelly, James Joseph	1866
Kleinau, George	1911	Smith, Claude Robert.....	1909
Klingmann, Albert	1910	Spring, George Alexander	1907
Koch, William Julius	1907	Stephenson, John Joseph	1905
Koplowitz, Barnet	1910	Takamine, Jokichi.....	1898
Lampa, Robert Raymond.....	1892	Timmermann, Richard Herman	1909
Lascoff, Jacob Leon.....	1903	Weicker, Theodore	1905
Latham, Thomas	1907	Weinstein, Abraham	1904
Lehman, Robert Seel	1910	Weinstein, Joseph.....	1905
Leibowitch, Morris	1910	Weiss, Emil Otto.....	1907
Lovis, Henry Christian.....	1892	White, Charles Hugh	1902
Lowe, Charles H.....	1908	Whyte, Joseph Menzies.....	1910
Main, Thomas Francis	1872	Wickham, William Hull	1870
Mandelbaum, Marcus R.....	1909	Wilson, William Henry	1907
Mansfield, William	1907	Wimmer, Curt Paul.....	1907
Mayer, Joseph L.....	1905	Wooyenaka, Keizo	1907
Mayo, Caswell Armstrong	1893		
McCartney, Frank Leslie	1907		
McIntyre, Ewen	1873	<i>Plattsburg.</i>	
McIntyre, Ewen, Jr.	1903	Hitchcock, John E.....	1892
McKesson, Donald	1906		
McKesson, George Clinton.....	1888	<i>Rochester.</i>	
McKesson, John, Jr.	1867	Hyde, Byron M.....	1908
Metz, Herman A.....	1910		
Mohwitz, Ernst	1867	<i>Salamanca.</i>	
Moore, Thomas Henry.....	1907	Krieger, John Christian	1908
Murray, Benjamin Lindley.....	1896		
		<i>Saratoga Springs.</i>	
		Fish, Charles Frederick	1866

Sayville.

Thornhill, Sewell 1909

*Springfield, Long Island.**De Forest, William Pendleton* 1879*Stapleton, Staten Island.*

Becker, Ulrich William 1904

Crolley, Theodore Alexander 1909

Shauwecker, Kenneth E. 1910

Syracuse.

Dawson, Edward Seymour, Jr. 1876

Muench, William 1899

Singleton, Arthur T. 1910

Snow, Charles Wesley 1876

Tottenville.

Lehman, Charles Norton 1909

Utica.

Evans, Arthur S. 1907

Slauson, John Gordon 1907

Watson, William, Jr. 1902

White Plains.

Roemer, John 1910

*Yonkers.*Petsche, Franz Friedrich Bismarck
Wilhelm 1892

NORTH CAROLINA.

Asheville.

Raysor, Cornelius Ayer 1908

Chapel Hill.

Howell, Edward Vernon 1900

China Grove.

Swaringen, DeWitt Clinton 1905

Durham, Orange Co.

Vaughan, Parry Wyche 1882

Fayetteville.

Horne, Warren Winslow 1902

High Point.

Ring, William Alexander 1909

Lenoir.

Shell, Junius E. 1908

New Bern.

Bradham, Caleb Davis 1902

Rowland.

Ward, Homer Benjamin 1901

Sanford.

Reid, William Watts 1906

Southport.

Watson, George Yandell 1910

Tarboro.

Zoeller, Edward Victor 1878

Tryon.

Missildine, Ernest Ellwood 1910

Wilmington.

Hardin, John Hapwood 1881

Winston-Salem.

McArthur, Robert Milton 1908

NORTH DAKOTA.

Abercrombie.

Ware, Clarence Walter 1907

Bismarck.

Finney, Burt 1909

Fargo.

Bentson, Barnard Leo 1909

Hallenberg, Oscar 1909

Meredith, Cela Robert 1909

Porterfield, William Perry 1909

Zieffle, Adolph 1910

Grafton..

Haussamen, Henry Louis 1906

Lansford.

Bromme, William Louis 1907

Lisbon.

Parker, William Stillman 1909

Valley City.

Siegfried, Henry J. 1905

Willow City.

Master, Walter 1909

OHIO.

Ada.

Mohler, David Christian 1906

Akron.

Dutt, William 1905

Green, Walter Lowell.....1909
 Lemasters, William Otterbein1905

Ashtabula.

Tracy, Kenneth William.....1907

Barnesville.

Ely, Ernest Sykes1904

Bellevue.

Brinker, John Henry.....1906

Canton.

Roth, Charles Robert1900
 Schlabach, Edward John1904
 Shanafelt, Fred P.....1909
 Sollmann, Luitpold1908

Chillicothe.

Howson, Arthur Bagshawe.....1886

Cincinnati.

Apmeyer, Charles Ascau.....1906
 Drackett, Philip Wilbur1908
 Fennel, Charles Theodore Piderit.....1886
 Freericks, Frank Herman.....1905
 Gansz, William Henry1905
 Greyer, Julius.....1880
 Katz, Otto1904
 Kisker, Frederick William.....1906
 Kutchbauch, John Frederick.....1904
 Lloyd, John Uri1870
 Merrell, Charles George.....1888
 Merrell, George1879
 Serodino, Herman.....1880
 Stier, George F.....1907
 Voss, Edward, Jr.....1904
 Wetterstroem, Theodore David.....1897
 Yorston, Matthew Mackay1864
 Zuenkeler, John Ferdinand.....1887

Circleville.

Fickardt, Frederick Lutz1904

Cleveland.

Arny, Harry Vin1891
 Benfield, Charles William1893
 Benfield, Walter Edwin1908
 Braun, Julius C.....1909
 Cobb, Ralph Lathrop1883
 Coleman, Glenn Forrest1909
 Feil, Joseph1885
 Fischer, Henry John1902
 Flandermeyer, August L.....1910
 Fox, Willard Milton1903

Graebner, Otto Henry.....1907
 Hankey, William Tabor1902
 Hannan, Owen Burdette.....1893
 Hechler, Edward Henry.....1904
 Hopp, Lewis Christopher1876
 Krause, John1906
 Krejci, Leo Charles.....1907
 Lehr, Philip1885
 Maguire, Edward Sylvester.....1897
 Miller, Frederick John1902
 Mitermiller, John Alfred1903
 Muhlan, Otto Emil :.....1905
 Munz, Winfield David.....1909
 Petersilge, Emil1909
 Placak, Harry.....1902
 Rosenberg, Samuel Solomon.....1907
 Schellentrager, Ernest August.....1906
 Schoenbut, Christian Henry1888
 Selzer, Eugene Reinhold.....1893
 Sherwood, Henry Jackson1894
 Sieplein, Charles Augustus.....1904
 Sollmann, Torald.....1908
 Sords, Thomas Vincent.....1893
 Tielke, Maxwell Gustave1904
 Winter, Carl.....1910
 Woolsey, Jesse Francis1910

Columbus.

Ackerman, Philip Jacob1906
 Dye, Clair Albert.....1901
 Haney, Thomas Carlyle1903
 Hatton, Ellmore Wright1894
 Herpich, John Le Dure1906
 Kaemmerer, William Frederick.....1899
 Kauffman, George Beecher1882
 Kiler, Abdel William1908
 Ogier, William Robert1901
 Sauerbrum, Otto Orville.....1905
 Schueller, Frederick William.....1880
 Webb, Edward Nathan1905
 Wendt, William Carl1901

Conneaut, Ashtabula Co.

Symonds, Arthur Henry.....1892

East Cleveland.

Reed, James Garfield1909

East Liverpool.

Holloway, Jesse Daniel1905

Elyria.

Crane, Percy P.1908

<i>Grand Rapids, Wood Co.</i>	
Thurston, Azor	1886
<i>Hopedale.</i>	
Stringer, Orum Hines	1905
<i>Ironton.</i>	
Koegel, Herman Henry	1907
<i>Logan.</i>	
Harrington, Frank.....	1869
<i>Mansfield.</i>	
Ashbrook, Charles Shaw	1910
<i>New Philadelphia.</i>	
Schlup, Samuel, Jr.....	1908
<i>Pomeroy.</i>	
Roush, Frederick Alman.....	1905
<i>Sandusky.</i>	
Biehl, Lewis A.....	1908
<i>Scio.</i>	
Beal, George Denton.....	1907
Beal, James Hartley	1892
Creighton, Mary Louisa	1903
<i>Shadyside.</i>	
Dawson, Edward Bruce	1907
<i>Springfield.</i>	
Siegenthaler, Harvey Newton ..	1882
<i>Strasburg.</i>	
Stanbarger, Morris Howard.....	1906
<i>Toledo.</i>	
Bowman, Waldo Moffett.....	1905
Huston, Thomas William.....	1908
Ludwig, William Edward.....	1904
<i>Troy.</i>	
Tobey, Charles William	1909
<i>Twinsburg.</i>	
Stingel, Jacob Leroy	1909
<i>Washington.</i>	
Warfield, James Allen.....	1905
<i>Youngstown.</i>	
Cassaday, Orlin Ulysses	1899
Ohl, Jay Denham.....	1909
<i>Zanesville.</i>	
Highfield, Herbert Monroe	1908

OKLAHOMA.	
<i>Atoka.</i>	
Lewis, Theodore Cuyler	1911
<i>Beggs.</i>	
Flood, Daniel A.	1909
<i>Caddo.</i>	
Dodd, William F.	1909
<i>Checotah.</i>	
Kniseley, Herman Dee.....	1905
<i>Durant.</i>	
Schenk, Fannie Kennedy (Mrs.)	1906
<i>Edmond.</i>	
Foster, John Wesley	1908
<i>Guthrie.</i>	
Lillie, Foress Ball.....	1900
<i>Hennessey.</i>	
Dinkler, Frank Adam	1900
<i>Hugo.</i>	
Lucas, George Robert.....	1909
<i>Idabel.</i>	
Knisely, Elmer L.	1909
<i>Muldrow.</i>	
Breedlove, Wharton Hicks.....	1909
Knisely, John Ross	1909
<i>Muskogee.</i>	
Hancock, Numa Fletcher.....	1909
<i>Norman.</i>	
De Barr, Edwin.....	1905
Washburn, Homer Charles.....	1905
<i>Oklahoma City.</i>	
Westfall, Paul	1909
<i>Pauls Valley.</i>	
Bruce, Clarence Perkins	1909
<i>Pond Creek.</i>	
Dow, Charles Asher.....	1909
<i>Shawnee.</i>	
Machenheimer, Don Grover.....	1906
<i>Stroud.</i>	
Burton, John Clement.....	1902

Sulphur.

McGinnis, E. K. 1908

Tulsa.

Impey, William Francis 1909

OREGON.

Astoria.

Laurin, Theodore Frithiof 1909

Corvallis.

McKellips, Clarence 1909

Eugene.

Kuykendall, William A. 1909

Grants Pass.

Slover, James Anderson 1909

Hood River.

Clarke, Charles Noble 1909

Marshfield.

Brown, James Lee 1903

North Bend.

Everitt, Miles Elsworth 1909

Pendleton.

Koeppen, Albert C. 1909

Portland.

Allen, Alonzo Wright 1909

Byerley, Fabian 1909

Clarke, Louis Gaylord 1909

Crysler, Ralph 1909

Gradon, Walter Allen 1909

Kaack, Ludolph George 1909

Koehler, William Francis 1909

Laue, John Max Alfred 1904

Lowthian, John Peter 1909

McMillan, Daniel Newcomb 1909

Plummer, Rass Mills 1909

Pozzi, Frank Camillo 1908

Ricen, Joseph Moses 1909

Rich, Stanley Hawton 1909

Robertson, Felix Otey 1890

Salem.

Harbold, Kittie Walker 1905

Miller, William Louis 1910

Silverton.

Johnson, Lewis 1909

The Dalles.

Blakeley, George Clarence 1892

Luck, Julius Alexander Willi 1910

Union.

Reuter, Walter Henry 1907

Wasco.

Marsh, Josiah 1909

PENNSYLVANIA.

Allegheny City.

Sample, Oliver Hazen 1907

Woodford, Carlos Havens 1910

Altoona.

Branttinger, Joseph Frederick 1910

Ardmore.

Morse, Horace Binney 1908

Austin.

French, Fred. A. 1911

Bellevue.

Young, David Boyer 1908

Beltwood.

Grauer, Norman Albert 1909

Brackenridge.

Chapman, Joseph T. 1910

Braddock.

Czyzewski, Blasius Joseph 1909

Kutscher, George William 1905

Latou, William L. 1908

Butler.

Grohman, Edward John Charles 1909

Canonsburg.

Morrison, George Shattuck 1905

Carlisle.

Horn, Wilbur Fisk 1876

Carnegie.

Reichert, Louis, Jr. 1910

Carrick.

McNulty, James Cleland 1909

Castle Shannon.

Doyle, Joseph Jesse 1909

Chambersburg.

Greenawalt, S. Miller 1907

<i>Charlertoi.</i>		<i>Johnstown.</i>	
Gruen, John George	1906	Campbell, Andrew	1909
<i>Columbia.</i>		Griffith, Charles	1900
Zeamer, Harry Wisler	1905	Griffith, James Arthur	1905
<i>Du Bois.</i>		<i>Kingston.</i>	
Hay, Charles La Mar	1898	Pegg, Harry Wilson	1908
<i>Duquesne.</i>		<i>Lancaster.</i>	
Pietkiewicz, Wladyslaw Lion	1908	Frailey, William Otterbein	1903
<i>Easton.</i>		Heinitsh, Sigmund William	1889
Anspach, Paul Bucher	1903	<i>Latrobe.</i>	
Voorhees, Harry Burns	1906	Livengood, Daniel Webster	1909
<i>Eddystone, Delaware Co.</i>		<i>Lebanon.</i>	
Morris, Lemuel Iorwerth	1880	Lemberger, Joseph Lyon	1858
<i>Edwardsdale.</i>		<i>Lincoln Place.</i>	
Lohmann, John	1904	Moore, Ida Louise	1909
<i>Elkins Park.</i>		<i>Lititz.</i>	
Osborne, Melmoth Mercer	1906	Moyer, Lewis Nathan	1903
<i>Freedom.</i>		<i>Manheim, Lancaster Co.</i>	
Robin, David Nathaniel	1910	Ruhl, Harry Fry	1902
<i>Greencastle.</i>		<i>Mars.</i>	
Carl, Charles Blair	1910	Willets, Charles Ellsworth	1905
<i>Grove City.</i>		<i>McKeesport.</i>	
DeFance, George W.	1910	Camp, Eugene M.	1910
<i>Harrisburg.</i>		<i>McKees Rocks.</i>	
George, Charles Theodore	1873	Sandles, Van Amburg	1909
Gorgas, George Albert	1884	<i>Meadville.</i>	
Kramer, Charles F.	1910	Utech, Philip Henry	1907
Smith, Benjamin Franklin	1892	<i>Media.</i>	
<i>Hatboro.</i>		Meeker, George Herbert	1905
Rothwell, Walter	1907	<i>Mt. Joy, Lancaster Co.</i>	
<i>Haverford.</i>		Garber, Elmer Franklin Weaver	1901
Harbaugh, Wilson Linn	1896	<i>New Castle.</i>	
<i>Homestead.</i>		Douglas, Austin Earl	1908
Bandy, Lewis Abram	1908	Wallace, John Crawford	1905
Markowitz, Abe	1909	<i>Norristown.</i>	
Smetana, Andy Joseph	1909	Reed, Willoughby Henry	1893
<i>Houtsdale.</i>		<i>North Warren.</i>	
Arnold, William Charles	1908	Morgan, John Alexander	1910
<i>Indiana.</i>		<i>Ogonts.</i>	
Houck, David Lee	1909	Clayton, Abram Theophilus	1906

Oil City.

Barbér, Harriet A.	1909
Gaddess, John	1908
Gaddess, Thomas	1908

Philadelphia.

Apple, Franklin Muhlenberg	1905	Heim, William Joseph	1902
Baer, Jacob Michael	1902	<i>Heintzelman, Joseph Augustus</i>	1858
Bernstein, Mitchell	1910	Henry, Samuel Clements	1909
Blackwood, Russell Thorn	1907	Hoch, Aquilla	1896
Blair, Henry Cowan	1904	Hoch, Quintus	1907
Borell, Henry Augustus	1874	Hughes, Francis Stackner	1902
Boring, Edward McCurdy	1867	Hunsberger, Ambrose	1905
Bradshaw, Henry A.	1908	Kahn, Solomon Karl	1905
Brenner, Morris William	1910	Kercher, Edwin Harry	1907
Brinton, Clement Starr	1907	Kimberly, Charles Hubbell	1908
Burg, John Dellinger	1888	Kirby, Charles P.	1909
Busch, Henry Paul	1910	Kirk, Frank Hall	1907
Busch, Miers	1903	Kirk, Samuel Bird	1907
Cadmus, Robert Clark	1906	Kline, Clarence Mahlon	1902
Campbell, Milton	1902	Koch, Christopher	1907
Campbell, Theodore	1902	Kraemer, Henry	1892
Carpenter, William Asbury	1910	Kraus, Otto	1906
Clapham, Hesser Charles	1907	Lacey, William Henry	1907
Cliffe, William Lincoln	1898	Lackey, Richard Henry	1907
Conover, Samuel Harry	1908	Lantz, William Henry	1908
Cook, Ernest Fullerton	1901	LaWall, Charles Herbert	1896
Cope, Frank Henry	1909	LaWall, Millicent Renshaw (Mrs.) ..	1905
Cuthbert, Richard William	1906	Lee, William Estell	1905
Decker, William Robert	1907	Leedom, Charles	1902
<i>Ellis, Evan Tyson</i>	1857	Long, John Nathan Grier	1906
England, Joseph Winters	1893	Lowe, Clement Belton	1895
Evans, George Bryan	1902	Martin, Harry	1908
Feidt, George David	1898	Matusow, Harry	1897
Fox, Peter Paul	1869	McCartney, Frank Stewart	1908
French, Harry Banks	1890	McConomy, Paul Lucien	1906
French, Howard Barclay	1906	McFerren, Jeremiah Dull	1906
Gabell, Cromwell Pearce	1907	McIntyre, William	1868
Gano, William Hubbell	1892	McNeil, Robert	1907
Garvey, James Aloysius	1909	Meade, Harold Barr	1910
Githens, Thomas Statesbury	1909	<i>Mellor, Alfred</i>	1864
Goldberg, Joseph	1908	Miller, Adolphus William	1868
Goodhart, Brua Clifford	1909	Minehart, John Roy	1905
Graham, Willard	1902	Moerk, Frank Xavier	1898
Hahn, Edward Titus	1910	Monaghan, Thomas Francis	1902
Hance, Anthony Miskey	1902	Morgan, Frank E.	1906
Hance, Edward Hance	1857	Mulford, Henry Kendall	1896
Harbold, Curtis Alexander	1907	Nebig, William George	1907
Harbold, John Tilden	1905	Oliver, Frank Murphy	1906
Hassinger, Samuel Ellphat Reed	1880	Osterlund, Otto William	1902
Hausmann, Frederick William	1895	Ottinger, James Jeremiah	1876
Haydock, Susannah Garrigues	1905	Pachili, Theodore, Jr.	1907
		Peacock, Bertha Leon (Mrs.)	1895
		Peacock, Josiah Comegys	1892
		Pearson, William Alexander	1908
		Pfeiffer, Gustavus Adolphus	1910
		Pile, Gustavus	1881
		Poley, Warren Henry	1906

Pollard, Augustus Torrey	1906	Kossler, Herman Stanislaus	1905
Rauff, U. Gilbert	1907	Kress, Samuel	1907
Rehfuss, Charles	1908	Kretz, Edward John	1909
Remington, Joseph Price	1867	Lohmeyer, Henry L.	1910
Riegel, Samuel Jacob	1905	McAdams, William J.	1908
Roach, Jeremiah Thomas	1907	Mierzwa, Richard	1908
Rohrman, Frank Randall	1910	Minor, Harry S.	1909
Rosengarten, George David	1902	Moyer, Ray Paul	1907
Sadtler, Samuel Philip	1893	Patterson, Charles Meade	1905
Shafer, Erwin Clement	1893	Plough, William Henry	1908
Shoemaker, Clayton French	1902	Pritchard, Benjamin Elliott	1908
Shoemaker, Richard Martin	1865	Rodemoyer, William Edward	1901
Seidman, Harry	1911	Saalbach, Carl	1908
Siegfried, Howard J.	1907	Saalbach, Louis	1907
Smith, Albert Henry	1902	Schaefer, Charles Henry	1904
Smith, Howard E.	1910	Schaefer, Emil August	1900
Smith, Walter Valentine	1902	Scholz, William Frank	1908
Stanislaus, Ignatius Valerius Stanley ..	1906	Soult, Ray Mont	1905
Staudt, Albert John	1907	Stiefel, Albert Frederick	1909
Stewart, Francis Edward	1884	Thompson, John Reynolds	1905
Streep, Frank Park	1907	Walter, Peter Grant	1905
Stroup, Freeman Preston	1900	Wurdack, John Herman	1909
Thum, John Karl	1905	Yellig, Daniel C.	1909
Turner, Joseph L.	1906		
Warner, William Richard, Jr.	1902		
Weidemann, Charles Alexander ..	1868		
Weidemann, George Buzby	1902		
Weisner, Nicholas Fredrick	1909		
White, Robert Charles	1906		
Wood, Horatio C., Jr.	1906		
<i>Pittsburg.</i>			
Alvino, Ernest Eugenio	1910		
Aschman, F. T.	1909		
Bell, William Ray	1906		
Blank, Herman Gustave	1905		
Blumenschein, Frederick John	1904		
Calhoun, Will N.	1908		
Dablin, Horace Otto	1905		
Darbaker, L. K.	1909		
Eiben, John Joseph	1909		
Emanuel, Louis	1878		
Emanuel, Louis, Jr.	1909		
Erskine, George Walker	1909		
Evans, Harry Oliver Newton	1908		
Fawcett, Charles Emerson	1905		
Hoechstetter, Max Sigmund	1908		
Holsopple, J. Bert	1905		
Horwitz, Leon	1909		
Itis, George Washington	1905		
Judd, Albert Floyd	1901		
Koch, Julius Arnold	1892		
		<i>Pottsville.</i>	
		Deibert, Thomas Irwin	1882
		<i>Reading.</i>	
		Ziegler, Howard Philip	1905
		Ziegler, Philip Milton	1867
		<i>Quarryville.</i>	
		Shaub, Jacob Raymond	1908
		<i>Scranton.</i>	
		Davis, Emma May	1905
		Knoepfel, William Henry	1900
		Thomas, Daniel Judson	1905
		<i>Sewickley.</i>	
		Minesinger, Norman Wilhelm	1906
		<i>Sharpsburg.</i>	
		Stech, George Oscar, Jr.	1908
		<i>St. Mary's.</i>	
		Herron, Charles Selburn	1911
		<i>Steelton.</i>	
		McCurdy, John A.	1910
		<i>Swissvale.</i>	
		Johnson, Ralph Henry	1901
		<i>Towanda.</i>	
		Porter, Henry Carroll	1872

Washington.

McConaughy, Thomas Singleton.....1905
 Minton, Charles Newton.....1908
 Vowell, Lewis Sweitzer.....1905

Waynesburg.

Gleghorn, James Seymour.....1900
 McGovern, John Francis.....1906

Wilkinsburg.

Beacom, C. Edwin.....1909
 Berg, Albert Leonard.....1908
 Toner, Robert Thomas.....1908

Williamsport.

Cornell, Edward Augustus.....1873
 Millener, William S.....1905
 Smith, Edward W.....1902
 Walton, Lucius Leedom.....1904

Woodlawn.

Bryson, William Smith.....1905

York.

Leber, Jacob Gilbert.....1905
 Patton, John Franklin.....1880
 Rush, Walter Edward.....1910

PHILIPPINE ISLANDS.

Benguet.

Hamner, James Faris.....1906

Canacao.

Miller, Charles Elliott.....1899

Manila.

Comfort, Newton C.....1904
 Guerrero, Leon Maria.....1904
 Zamora, Manuel.....1908

RHODE ISLAND.

Narragansett Pier.

Davis, Peter Bernard.....1909

Newport.

Downing, Benjamin Franklin.....1886
 Wood, John William1897
 Wright, James Tytler.....1910

Pawtucket.

Brennan, James Edward.....1909
 Johnson, Alfred J., Jr.....1911
 Morgan, George Smith.....1909

Providence.

Anthony, Edwin Perkins.....1909
 Blanding, William Oliver.....1894
 Blumenkranz, Emil Simon.....1911
 Bowmer, Clarence.....1911
 Colton, Edward Thomas.....1909
 Fairbanks, George Edwin Barrows...1909
 Greene, William Ray.....1883
 Haynes, Herbert.....1908
 O'Hare, James.....1888
 Parker, Gilbert Ritchie.....1910
 Pearce, Howard Anthony.....1894
 Ritter, Clarence Johnson.....1910
 Strickland, Franklin Nelson.....1905

SOUTH CAROLINA.

Charleston.

Hyde, Joseph Bell, Jr.....1909
 Plenge, Henry.....1910

Greenville.

Mauldin, John McHardy.....1910

Spartanburg.

Bell, Elwood Fisher.....1909

SOUTH DAKOTA.

Aberdeen.

Woodward, Albert Alvin.....1910

Ashton.

Olson, Ferdinand P.....1910

Beresford.

Bruehler, George J.....1910
 Kriebs, Frank Delbert.....1910

Bowdle.

Maas, Henry Conrad.....1910

Brookings.

Whitehead, Bower Thomas.....1908

Centerville.

Heisler, John Emery.....1910

Columbia.

Hughes, John Richard.....1910

Conde.

Goldthorp, George Alexander.....1910

Deadwood.

Deetken, Julius.....1910

<i>Dell Rapids.</i>		<i>Jackson.</i>	
Bent, Edward Clarence	1905	Nance, Oscar Jones	1909
<i>Estelline.</i>		<i>Knoxville.</i>	
Hoffelt, Edward	1910	Rosenthal, David Abraham	1894
<i>Geddes.</i>		<i>Memphis.</i>	
Pinaud, Pierre Romeo	1908	Duntze, Francis Clarke, Jr.	1908
<i>Huron.</i>		Mayo, Frederick William	1909
Longstaff, William	1910	Ott, Clarence Roy	1908
Perriton, Henry A.	1910	Robinson, James Scott	1869
<i>Lake Preston.</i>		Ward, Francis Watson	1908
Keith, Irwin Alonzo	1906	<i>Nashville.</i>	
<i>Langford.</i>		Austin, Kenley Glass	1910
Williams, Arthur Reynolds	1910	Blackman, William Marshall	1910
<i>Lead.</i>		Bloomstein, Max	1910
Brown, Floyd Woodford ...	1910	Brown, Lucius Polk	1910
Stillman, Charles L.	1910	Burge, James Oscar	1878
<i>Lily.</i>		Clark, Ira Berton	1909
Ross, Otto Ellsworth	1908	Cook, Moses	1910
<i>Mitchell.</i>		Desha, Lucius Junius	1910
Scallin, Stephen Harmon	1910	Eves, Robert Lee	1909
<i>Mt. Vernon.</i>		Hutton, Major Ernest	1910
Hiner, Virgil	1910	Kuhn, David Jacob	1910
Schirmer, S. F.	1910	Martin, Andrew Joseph	1910
<i>Redfield.</i>		McGill, John Thomas	1900
Swartz, George Fisher	1909	McGinnis, James Davis	1910
<i>Sioux Falls.</i>		Moore, Stephen William	1910
Bernhart, Peter Kristoffer	1910	Pully, Luther Smith	1910
Dunning, Lyman Taylor	1906	Rascoe, Roy	1910
<i>Tyndall.</i>		Rippetoe, William Benson	1910
Cotton, Robert M.	1908	Ruddiman, Edsel Alexander	1894
<i>Watertown.</i>		Sand, Jerome Bonepart	1910
Jones, David Franklin	1895	Schott, Ernest John	1910
Zieske, Arthur	1910	Smith, Frank Leslie	1910
<i>Yankton.</i>		Trolinger, Ernest Franklin	1909
Brecht, Frederick Adolph	1895	White, William Rufus	1904
TENNESSEE.		Young, Clarence Coery	1910
<i>Chattanooga.</i>		Zbinden, David Harold	1910
Voigt, Joseph Frederick	1893	Zbinden, Harold Felix	1910
<i>Columbia.</i>		<i>Sharon.</i>	
Smith, Richard	1910	Shannon, Thomas J.	1905
<i>Flora.</i>		<i>West Nashville.</i>	
Walker, Elias Russell	1908	Wright, Billie Calvin	1910
		TEXAS.	
		<i>Austin.</i>	
		Carleton, Henry Lincoln	1910
		Jackson, Hugh Cyrus	1909

Beaumont.

Vredenburg, Bruce 1909

Bomarton.

Seydler, Robert 1910

Brownsville.

Willman, William George 1904

Burnet.

Knox, Robert James 1909

Celina.

Willis, Roland M. 1910

Clifton.

Brooks, James Mordecai..... 1909

Cooper.

Snell, Thomas Jefferson 1909

Corpus Christi.

Brandes, Walter Charles..... 1910

Corsicana.

Coulson, James Thomas 1906

McDaniel, John Preuit..... 1908

Dalhast.

Wilson, Henry Baylor..... 1910

Dallas.

De Lorenzi, Albert 1890

Duncan, Chester Arthur 1906

Eberle, Eugene Gustavus 1896

Hickox, Milton 1909

Jelton, Louis McKnight..... 1910

Rogers, Russell Vivian 1910

Schrodt, Jacob..... 1903

Vinal, George..... 1911

Denton.

Allison, Samuel Porter 1905

El Paso.

Hunter, Angus... .. 1906

Ryan, Ambrose Eugene 1907

Ward, Herbert..... 1909

Weaber, John Alvin 1906

Elgin.

Deener, Richard Simpson 1909

Ennis.

Glover, Ethridge Emil 1909

Forth Worth.

Brashear, James Preston..... 1909

Casey, Thomas Arthur 1910

Coulson, Jack..... 1909

Covey, John Walker 1908

Martin, Cassius Clay..... 1911

Needham, Robert Hamilton 1906

Galveston.

Buckner, John Clark..... 1905

Cline, Raoul René Daniel..... 1898

Koester, Hermann 1910

Orton, Ingomar François 1891

Turk, Bascom Andrew 1908

Gonzales.

Robertson, William Franklin..... 1907

Walker, Robert Hamilton 1907

Hallettsville.

Saccar, Michael 1905

Houston.

Burgheim, Jacob 1892

Kiesling, Adolph Ernest..... 1910

Hughes Springs.

Glass, William Finis 1904

Kaufman.

Graves, John Calvin 1910

Lockhart.

Westmoreland, Edwin Reese..... 1910

Lovelady.

Lawrence, King David..... 1911

McKinney.

Dulaney, Joseph Field..... 1902

Miami.

Jones, Andrew Mack..... 1910

Munday.

Cousins, Walter Henry 1909

New Braunfels.

Voelcker, Edwin Bruno 1908

Osceola.

Mattox, Ephraim N..... 1911

San Antonio.

Nester, Herman August 1909

Schaefer, Laura 1909

<i>Saint Jo.</i>	
Pedigo, Smith Christopher.....	1907
<i>San Saba.</i>	
Gosch, Clarence G.....	1910
<i>Troupe.</i>	
McKay, Felix Early.....	1903
<i>Tyler.</i>	
Antrey, W. Claude	1910
Williams, Berry	1911
<i>Velasco.</i>	
Roeller, Edward Frank....	1902
<i>Waelder, Gonzales Co.</i>	
Brookes, Virginia Cade.....	1901
<i>Wichita Falls.</i>	
Cousins, Walter Henry	1909
<i>Winters.</i>	
Tucker, George Roscoe	1911
<i>Yoakum.</i>	
Koerth, Emil Christian.....	1910
<i>Yorktown.</i>	
Bomba, Onfrey Joseph	1910
UTAH.	
<i>Brigham.</i>	
Eddy, Wynn Leland	1908
<i>Cedar City.</i>	
Bladen, John Mount	1908
<i>Fort Duchesne.</i>	
Duignan, John	1911
<i>Logan.</i>	
Riter, Benjamin Franklin.	1910
<i>Manti.</i>	
Cahoon, Shirley	1909
<i>Milford.</i>	
Misch, Edward Frederick	1910
<i>Ogden.</i>	
Culley, John	1908
<i>Provo City.</i>	
Hedquist, Alexander	1908
Hedquist, Francis J.....	1908
Sutton, Arthur D.....	1908

<i>Salt Lake City.</i>	
Coffman, Walter Thomas	1904
Coombs, Harry.....	1910
Devton, Walter Henry	1908
Druehl, Frank August.....	1908
Halliday, Thomas Law.....	1908
Harms, Herman E.....	1908
Harvey, Charles Julian	1908
Johnson, Joy Happy	1908
Nelden, Ralph	1908
Peters, Otto Rudolph	1908
Schramm, Frederick Clement.....	1908
Van Dyke, Charles	1908
Whitworth, Frank Edgar	1908

<i>Smithfield.</i>	
Colpin, Emanuel Edward	1907

VERMONT.

<i>Barre.</i>	
Davis, Daniel Frost.....	1907
<i>Barton.</i>	
Pierce, Fred Dutton	1909
<i>Burlington.</i>	
Parker, Frank Henry	1909
Zottman, William Henry.....	1903

<i>Marshfield.</i>	
Gilman, Elbridge Wheeler	1907
<i>Montpelier.</i>	

Slade, Henry Allen	1899
Terrill, Willis Ethel	1899

<i>Morrisville.</i>	
Cheney, Arthur Lewis.....	1907

<i>N. Ferrisburg.</i>	
Claffin, Walter Addison	1896

<i>Orleans.</i>	
Austin, Arthur Orlo.....	1909

<i>Rutland.</i>	
Trudel, Lucien Joseph	1910

<i>St. Johnsbury.</i>	
Bingham, Charles Calvin	1875

<i>Vergennes.</i>	
Warner, William Russell	1909

VIRGINIA.

Barton Heights.

Miller, Rosbier W. 1906

Bedford City.

Roadcap, Silas M. 1908

Big Stone Gap.

Myers, George Baron 1909

Culpeper.

Goldsborough, Charles Henry 1898

Falls Church.

Mankin, George Tyree 1909

Harrisonburg.

Avis, James Little 1905

Lynchburg.

Fleet, Charles B. 1909

Hamner, Edward Chambers 1909

Martinsville.

Kearfoot, Clarence Piercall 1908

Norfolk.

Martin, William Rogers 1905

Nelligar, Frederic Dennis 1907

Phoebe.

Congdon, George Gardner 1903

Richmond.

Bolenbaugh, Albert. 1909

Booker, Robert Lewis 1910

Brandis, Ernest Linwood 1906

Briggs, Andrew Gessner 1890

Curd, Thomas Nelson 1907

Ford, Lacy Thornton 1910

Harrison, Robert Lucius 1900

Johann, Adam Ernest 1910

Miller, Turner Ashby 1894

Taylor, Edgar Dalby 1910

Roanoke.

Barnes, Henry Cooper 1905

Johnson, John Chilton ... 1909

Suffolk.

Hall, Joseph Patten 1900

WASHINGTON.

Chehalis.

Prigmore, George Daniel 1909

Farmington.

Thompson, Mason L. 1908

Fern Hill.

Jensen, Peder. 1909

Kahlotus.

Doughty, Edwin R. 1909

La Conner, Skagit Co.

Joergensen, Gerhard Johan Carl Sophus. 1889

Port Townsend.

Kliemand, George 1907

Rogers, Edward 1902

Rutz, Walter 1908

Pullman.

Watt, George Henry 1896

Puyallup.

Truedson, Eric Per 1904

Seattle.

Aschermann, Gustav Singer 1905

Bartley, Deane C. 1910

Blalock, Jesse Nelson 1909

Block, Anthony E. 1909

Brown, Burton Augustus 1910

Dewey, Albert Haskin 1909

Guy, George Omar 1908

Holmes, Henry Elliott 1880

Johnson, Charles Willis 1903

Kurtz, William Berthold. 1909

McCaughan, John Harold 1908

Osseward, Cornelius 1897

Rein, Tania 1910

Rubenstein, Louis 1909

Vaughn, Patrick Henry 1907

Watson, Joseph Ryerson 1904

West, Benjamin Franklin 1909

Snohomish.

Wilbur, Lot 1896

Spokane.

Leftwich, Harry Percy 1906

McArthur, James W. 1904

Tacoma.

Kent, Nich. Gardner 1909

Wilbur.

Bandy, George 1905

WEST VIRGINIA.

Bluefield.

Goodykoontz, Charles Henry.... 1909
 Schulze, Edward Charles 1909

Buckhannon.

Young, George Orvill 1907

Charleston.

Krieg, Arch 1910
 Price, Walter C. 1910

Clarksburg.

Haymaker, Frank Berkshire 1906

Glenville.

Tierney, James Aloysius 1910

Harper's Ferry.

Dittmeyer, Walter Eugene..... 1907

Hinton.

Rose, Shannon Samuel..... 1909

Majorsville.

Dinsmore, Warren..... 1908

Martinsburg.

Brown, Edward Preston 1906

Pine Grove.

Morgan, Thomas Lee 1907

Sutton.

Walker, Alfred..... 1905

Weston.

Levier, Oscar H..... 1908

Wheeling.

Coleman, John..... 1905

WISCONSIN.

Eau Claire.

Boberg, Otto Johan Sinius 1903

La Crosse.

Beyschlag, Charles..... 1880
 Hebbard, Edward Smith..... 1907

Madison.

Fischer, Richard 1901
 Kremers, Edward 1887

Lewis, Henry..... 1908
 Wakeman, Nellie Antoinette 1908
 Williams, Edward 1906

Manitowoc.

Sieker, Ferdinand August..... 1893

Menomonie.

Puhl, Richard Herman 1908

Milwaukee.

Dadd, Robert Morrow 1896
 Haertlein, George Henry..... 1910
 Hill, Warren Brown 1908
 Kettler, Edward, Jr..... 1896
 Krembs, Ernest Maximilian..... 1903
 Raeuber, Edward Gottfried 1900
 Ruenzel, Henry Gottlieb 1892
 Russell, Hugh C..... 1909
 Schranck, Charles Henry 1876
 Seyfert, Paul..... 1909
 Sommer, Richard Ernst Wilhelm 1909
 Spiegel, Adolph..... 1905
 Titus, Martin Edwin 1911

Neillsville.

Sniteman, Charles Clarence 1881

Oconomowoc.

Peters, Henry August 1903

Racine.

Horlick, Alexander James 1904
 Kradwell, Gustav A..... 1908

Reedsburg, Sank Co.

Mueller, Frank Frederick..... 1909

Richland Center.

Allen, Huestus Benjamin 1908

Watertown.

Eberle, Arthur Ralph 1907
 Eberle, Herman Theodore..... 1901

Wausau.

Albers, William W..... 1909

WYOMING.

Fort Mackensie.

Bettis, James L..... 1911
 Chase, George P. 1911
 Neville, Arthur..... 1911

DOMINION OF CANADA.

MANITOBA.

Winnipeg.

Bletcher, Henry Ernest John	1904
Campbell, Charles William	1910
Nesbitt, Evelyn	1910

NEW BRUNSWICK.

St. John.

Paddock, Morris Venner	1902
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NOVA SCOTIA.

Halifax.

Simson, Francis Cook	1876
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ONTARIO.

Guelph.

Stewart, Alexander	1905
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Ottawa.

Saunders, William	1860
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Stratford.

Waugh, George James	1862
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Toronto.

Heebner, Charles Frederick	1894
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QUEBEC.

Montreal.

Morrison, Joseph Edward	1888
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Three Rivers.

Williams, John Lewis	1909
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MEMBERS RESIDING IN FOREIGN COUNTRIES (*except Canada*).

Abreu, Gerardo Fernandez, Havana, Cuba	1907
Alacán, José Práxedes, Havana, Cuba	1907
Bernström, Nils Gustaf, Götenborg, Sweden	1906
Biosca, Placido, Havana, Cuba	1907
Bosque, Arturo, Havana, Cuba	1907
Capote, José, Havana, Cuba	1907
Cartaya, Julio Hernandez, Havana, Cuba	1907
Cuervo, Adolfo, Havana, Cuba	1907
Curquejo, Antonio Gonzales, Havana, Cuba	1907
De Jongh y Boudet, Pedro, Marti Matz, Cuba	1907
Diaz, José Guillermo, Havana, Cuba	1907
Hallaway, Robert Railton, Carlisle, England	1905
Herrera, Francisco, Havana, Cuba	1907
Heyl, James Bell, Hamilton, Bermuda	1863
Jacobs, Charles Christian, Sancti Spiritus, Cuba	1901
Johnson, Manuel, Havana, Cuba	1907
Ladakis, Triantaphyllo, Beirût, Syria	1907
Martin, Nicholas Henry, Gateshead-on-Tyne, England	1891
Morales, Celestino Garcia, Havana, Cuba	1907
Moya, Carlos A., Havana, Cuba	1907
Murray, Alexander, San José de Costa Rica	1903
Patch, James Alfred, Beirût, Syria	1903
Pirie, Alfred Mitchell, Cartago, Costa Rica	1903
Power, Frederick Belding, London, England	1872
Romero, Antonio Mejias, Manzanillo, Oriente, Cuba	1911
Sarra, Ernesto, Havana, Cuba	1907
Taquechel, Francisco, Havana, Cuba	1908
Valdes, Eduardo, Matanzas, Cuba	1907
Wellcome, Henry Solomon, London, England	1875
Zeledon C., Jose Antonio, San José, Costa Rica, C. A.	1909

MEMBERS WHOSE RESIDENCE IS UNKNOWN.

Fanous, Amin	1907
Griffith, James A.	1905
Hamilton, Carl	1908
Heaton, John Charlton	1909
Kress, Horace	1908
MacMillin, Edward Watson	1909
Marsh, George H.	1908
Martinez, Alfred	1907
Maurer, Henry C.	1909
Mayer, Joseph A.	1909
Neil, Dallas H.	1909
Perdue, William Louis	1907
Rinde, Samuel N.	1909
Scheips, Theodor Immanuel	1905
Schroeter, Herman M.	1907
Shpisman, Charles	1909
Stromberg, Eric W.	1908

NOTE.—Names of life members whose residence has been unknown for five consecutive years, are no longer published in the above list, in accordance with the action of the Council approved at the forty-eighth annual meeting. (See Proceedings, 1900, p. 18.)

ALPHABETICAL LIST OF MEMBERS.

HONORARY MEMBERS.

Holmes, E. M., F. L. S., 17 Bloomsbury Square, London, W. C., England.

Hooper, David, F. I. C., F. C. S., Indian Museum, 1 Sudder St., Calcutta, India.

Meyer, Professor Dr. Arthur, Marburg, Germany.

Schaer, Dr. Edward, Professor of Pharmacy, Pharmaceutisches Institut der Universität,
Strassburg, Germany.

Schmidt, Professor Dr. Ernst, Geh. Regierungsrath, Marburg, Germany.

Tschirch, Professor Dr. Alexander, Bern, Switzerland.

(1375)

ACTIVE MEMBERS.

Members are requested to notify the General Secretary of errors or inaccuracies in the following list. The Association will not replace volumes of Proceedings lost through changes of residence of which the General Secretary has not been notified. See Proceedings, 1866, p. 66.

- | | |
|---|--|
| Abbett, Wm. A.,
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Monroe, La |
| Acheson, William R.,
80 River st., Cambridge, Mass. | Allison, Samuel P.,
Denton, Tex. |
| Ackerman, Adolf H.,
148 Dudley st., Boston, Mass. | Allison, William O.,
100 William st., New York, N. Y. |
| Ackerman, Philip J.,
549 N. High st., Columbus, O. | Alpers, William C.,
495 Columbus ave., New York, N. Y. |
| Ackermann, Albert G.,
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| Adams, James O.,
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1336 E. Belmont ave., Chicago, Ill. |
| Ade, Daniel A.,
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 cor. 31st & Berks sts., Philadelphia, Pa.
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 Petoskey, Mich.
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 Austin, Kenley G.,
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 Averyt, Henry M.,
 426 Baldwin ave., Detroit, Mich.
 Avis, James L.,
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 Pelican Rapids, Otter Tail Co., Minn.
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 Ayres, Gold,
 England, Ark.
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 Baer, Jacob M.,
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 Baily, G. Frank,
 28 S. Hanover st., Baltimore, Md.
 Baird, Julian W.,
 102 St. Botolph st., Boston, Mass.
 Baker, De Forest,
 300 E. 43d st., Kansas City, Mo.
 Baker, Edwin,
 Bridge st., Shelburne Falls, Mass.
 Baker, Walter N.,
 400 Neponset ave., Boston, Mass.
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 Ballagh, Wilfred T.,
 S. E. cor. Square, Nevada, Mo.
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 Ballard, John W.,
 106 W. 2d st., Davenport, Ia.
 Ballou, Clarence O.,
 117 N. 8th st., Boise, Idaho.
 Balmert, Clemens A.,
 c. o. Citro Ch. Co., Maywood, N. J.
 Balser, Gustavus,
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 Baltar, Joseph T.,
 470 Jackson ave., New Orleans, La.
 Bancroft, Richard B.,
 310 Central ave., Hot Springs, Ark.
 Bandy, George,
 Wilbur, Wash.
 Bandy, Lewis A.,
 Homestead, Pa.
 Bange, Otto F.,
 cor. 11th & German sts., Newport, Ky.
 Barber, Harriett A.,
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 Barbre, John V., Jr.,
 Farmersburg, Ind.
 Bard, Wm. E.,
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 Baribault, Edward S.,
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- Barnard, Harry A.,
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 Barnes, Chas. D.,
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 Barnes, Henry C.,
 2 S. Jefferson st., Roanoke, Va.
 Barnett, Joel J.,
 c. o. Sharp & Dohme, Baltimore, Md.
 Barrett, Chas. L.,
 Broadway & Line st., Camden, N. J.
Bartells, George C.,
 130 East State st., Camp Point, Ill.
 Bartlett, James E.,
 162 N. Franklin st., Chicago, Ill.
Bartlett, N. Gray,
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 Bartley, Deane C.,
 1013 1st ave., Seattle, Wash.
 Bartley, Elias H.,
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 Base, Daniel,
 329 N. Schroeder st., Baltimore, Md.
 Baskette, Frank E.,
 156 B st., San Mateo, Cal.
Bassett, Charles H.,
 109 Arch st., Boston, Mass.
 Bastian, Otto C.,
 129 W. Washington st., S. Bend, Ind.
 Basye, Taylor C.,
 323 Main st., Rockport, Ind.
 Bate, Henry J.,
 559 E. 43d st., Chicago, Ill.
 Bateman, Herbert H.,
 337 N. Higgins av., Missoula, Mont.
 Battles, Wilton L.,
 426 Malvern st., Hot Springs, Ark.
 Baumann, Oscar,
 102 E. 3d st., Grand Island, Neb.
 Baur, Jacob,
 76 Illinois st., Chicago, Ill.
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 Scio, O.
 Beal, James H.,
 Scio, O.
 Bean, J. Arthur,
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 Beane, Chester H.,
 193 Water st., Gardiner, Me.
- Bear, Pierce B.,
 787 Broad st., Newark, N. J.
 Beasley, Robert S.,
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 Beck, Julius E.,
 Honolulu, H. I.
 Becker, Charles L.,
 304 Main st., Ottawa, Kan.
 Becker, Irwin A.,
 c. o. Michael Reese Hosp., Chicago, Ill.
 Becker, Ulrich W.,
 232 Bay st., Stapleton, N. Y.
 Bedard, Geo. H.,
 1219 Pearl st., Boulder, Colo.
 Bedford, Clifton C.,
 154 E. Main st., Twin Falls, Idaho.
 Behrens, Emil C. L.,
 2028 S. Halsted st., Chicago, Ill.
 Behrens, John F.,
 19 Cone st., Orange, N. J.
 Beilstein, Christian,
 87 Fulton st., New York, N. Y.
 Beise, John H.,
 Fergus Falls, Minn.
 Beitenman, William W.,
 2d & Bennett av., Cripple Creek, Colo.
 Bell, Elwood F.,
 288 Magnolia st., Spartanburg, S. C.
 Bell, Jno. M.,
 U. S. M. Hospital, Chicago, Ill.
 Bell, Wm. Ray,
 838 Clarissa st., Pittsburg, Pa.
 Bellack, Berthold H.,
 2303 Lincoln ave., Chicago, Ill.
 Bence, Eli,
 49 North st., Pittsfield, Mass.
 Bender, Walter C.,
 11th & Frederick sts., St. Joseph, Mo.
 Benedict, Philip V.,
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 Wilson & Payne aves., Cleveland, O.
 Benfield, W. Edwin,
 8527 Hough ave., N. E., Cleveland, O.
 Benkle, John G.,
 Kouts, Ind.
 Bent, Edward C.,
 Dell Rapids, S. Dak.
 Benton, Wilber M.,
 303 Main st., Peoria, Ill.
 Benton, Bernard L.,
 809 8th st., S., Fargo, N. Dak.

- Bentz, Henry G.,
 894 Michigan st., Buffalo, N. Y.
 Berg, Albert L.,
 725 Rebecca ave., Wilksburg, Pa.
 Berger, Ernest,
 P. O. Box, 566, Tampa, Fla.
 Berger, Louis,
 470 Lenox ave., New York, N. Y.
 Beringer, George M., Ph. M.,
 501 Federal st., Camden, N. J.
 Beringer, George M., jr.,
 1033 Cooper st., Camden, N. J.
 Berkowitz, Morris E.,
 U. S. M. Hosp., Chelsea, Mass.
 Berlin, Henry,
 1501 St. Charles ave., New Orleans, La.
 Bernström, N. Gustaf,
 Kronans Droghandel, Götenborg, Swed.
 Berner, Carl A.,
 16th st. & Grand ave., Des Moines, Ia.
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 127 N. Phillips av., Sioux Falls, S. Dak.
 Bernstein, Mitchell,
 910 Tasker st., Philadelphia, Pa.
Best, John,
 German Block, Central City, Colo.
 Bethea, Oscar W.,
 4th st. & 22d ave., Meridian, Miss.
 Bettes, Charles C.,
 53 W. Bay st., Jacksonville, Fla.
 Bettis, James L.,
 U. S. A. Hosp., Ft. Mackenzie, Wyo.
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 102 S. 12th st., Omaha, Neb.
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 516 Greensboro st., Tuscaloosa, Ala.
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 21 y M. Vedado, Havana, Cuba.
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 175 2d st., The Dalles, Ore.
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- Bowman, Reginald H.,
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 Bromme, William L.,
 Lansford, N. Dak.
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 Brown, Floyd W.,
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 Burnham, Ralph F.,
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 Burrill, Stanley,
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 71 Main st., Hackensack, N. J.
 Franzoni, Joseph D.,
 627 Penna. av. N.W., Wash'ton, D.C.
 Fraser, Horatio N.,
 563 5th ave., New York, N. Y.
 Frater, George,
 Louisville, Neb.
 Frauenhoff, Frederick L.,
 136 Hinman st., Aurora, Ill.
 Frazier, William J.,
 117 E. Douglas ave., Wichita, Kan.
 Freburg, Amel E.,
 402 7th st., Rockford, Ill.
 Freeman, James J.,
 1000 S. Grand ave., Los Angeles, Cal.
 Freericks, Frank H.,
 802 Mercantile Library Bldg., Cinn., O.
 French, Fred A.,
 Austin, Pa.
 French, Harry B.,
 429 Arch st., Philadelphia, Pa.
 French, Howard B.,
 York ave. & Callowhill st., Phila., Pa.
 Fricke, Chas. B.,
 1410 Davenport st., Omaha, Neb.
 Fricke, Frederick G.,
 Union Block, Plattsmouth, Neb.
 Fricke, Frederick H.,
 1637 N. 19th st., St. Louis, Mo.
 Friedenburg, M. W.,
 812 Main st., Winfield, Kan.
 Frohwein, Richard,
 122 1st st., Elizabeth, N. J.
 Frost, William A.,
 Selby & Western aves., St. Paul, Minn.
 Frutchey, George W.,
 201 E. Broad st., Wetsfield, N. J.
 Fry, Herman,
 610 W. North ave., Chicago, Ill.
 Fry, Narcys G.,
 401 W. North ave., Chicago, Ill.
 Frye, Geo. C.,
 320 Congress st., Portland, Me.
 Fuller, Oliver F.,
 220 Randolph st., Chicago, Ill.
 Furbush, Willis S.,
 1153 Broadway, W. Somerville, Mass.
 Gabell, Cromwell P.,
 5202 Lancaster ave., Philadelphia, Pa.
 Gable, Ralph B.,
 90 John st., New York, N. Y.
 Gaddess, John,
 20 E. First st., Oil City, Pa.
 Gaddess, Thomas,
 20 E. First st., Oil City, Pa.
 Gaesser, Theobald T., Ph. G.,
 Troy, Ind.

- Gahn, Henry,
PurveyDepot, Union Bldg., Wash., D.C.
- Gale, Edwin O.,
44 Monroe st., Chicago, Ill.
- Gale, William H.,
1053 N. 63rd st., Chicago, Ill.
- Gallagher, John C.,
466 Grove st., Jersey City, N. J.
- Gamble, Stewart,
301 Hennepin ave., Minneapolis, Minn.
- Gammon, Irving P.,
150 Dudley st., Boston, Mass.
- Gane, Eustace H.,
95 Fulton st., New York, N. Y.
- Gano, William H.,
1634 Columbia ave., Philadelphia, Pa.
- Gansz, William H.,
3129 Reading Road, Cincinnati, O.
- Garber, Elmer F. W.,
31 E. Main st., Mount Joy, Lanc. Co., Pa.
- Gardner, Alexander,
69 Myrtle ave., Brooklyn, N. Y.
- Garvey, James A.,
13th st. & Fairmount ave., Phila., Pa.
- Garvin, Patrick J.,
Center st., Bethel, Conn.
- Gathercoal, Edmund N.,
74 E. 12th st., Chicago, Ill.
- Gayle, John W.,
Ann st. & Broadway, Frankfort, Ky.
- Geisler, Joseph F.,
6 Harrison st., New York, N. Y.
- George, Charles T.,
1306 N. 3d st., Harrisburg, Pa.
- Gerald, Herbert F.,
Technol. Cham., Irv'ton, Boston, Mass.
- Gering, Henry R.,
Plattsmouth, Neb.
- Gessner, Emil A.,
862 Chapel st., New Haven, Conn.
- Gibson, Frank L.,
U.S.M.H.S., Kalawao, Molokai, H.I.
- Gibson, John S.,
Hope, Ark.
- Gidley, William F.,
Mercer University, Macon, Ga.
- Gietner, Charles,
300 S. 14th st., St. Louis, Mo.
- Gilman, Elbridge W.,
Main st., Marshfield, Vt.
- Gilpin, Henry B.,
300-302 W. Lombard st., Balto., Md.
- Githens, Thomas S.,
1337 Pine st., Philadelphia, Pa.
- Glass, William F.,
Lock Box 115, Hughes Springs, Tex.
- Gleason, Patrick S.,
cor. Pine & Elm sts., Waltham, Mass.
- Gleghorn, James S.,
Waynesburg, Pa.
- Glæssner, Bruce N.,
Abilene, Kan.
- Glogan, Alex.,
2742 N. Clark st., Chicago, Ill.
- Glover, Ethridge E.,
Ennis, Tex.
- Glover, William H.,
299 Essex st., Lawrence, Mass.
- Godbold, Fabius C.,
2734 Prytania st., New Orleans, La.
- Godding, John G.,
278 Dartmouth st., Boston, Mass.
- Goeckel, Henry J.,
57 E. 125th st., New York, N. Y.
- Goetting, Ernest C.,
820 Amsterdam ave., New York, N. Y.
- Goldberg, Joseph,
1217 N. 2d st., Philadelphia, Pa.
- Goldsborough, Charles H.,
Culpeper, Va.
- Goldthorp, George A.,
Conde, S. Dak.
- Good, James M.,
2601 Olive st., St. Louis, Mo.
- Goodale, Martin H.,
9 E. Main st., Battle Creek, Mich.
- Goodhart, Brua C.,
102 N. 19th st., Philadelphia, Pa.
- Goodman, Frank S.,
Ft. de Soto, Tampa Bay Quar. Sta., Fla.
- Goodman, John H.,
Fitzgerald, Ga.
- Goodrich, George H.,
Anoka, Minn.
- Goodsell, Willard R.,
1001 Ashland ave., St. Paul, Minn.
- Goodwin, Howard,
291 Atlantic ave., Boston, Mass.
- Goodwin, William W.,
Newburyport, Mass.
- Goodykoontz, Chas. H.,
Bluefield, W. Va.
- Gordin, Harry M.,
13 E. Chestnut st., Chicago, Ill.

- Gordin, William C.,
10th & Main sts., Wheeling, W. Va.
- Gordon, Arthur O.,
Merna, Neb.
- Gorenflo, Oscar W.,
Washington Arcade, Detroit, Mich.
- Gorgas, George A.,
16 N. Third st., Harrisburg, Pa.
- Gorman, Mary C. (Miss),
280 Main st., Marlboro, Mass.
- Gosch, Clarence G.,
San Saba, Tex.
- Graber, Howard T.,
727 E. Congress st., Detroit, Mich.
- Grace, William D.,
14 Market Square, Portsmouth, N.H.
- Gradon, Walter A.,
241 First st., Portland, Ore.
- Graebner, Otto H.,
1567 E. 45th st., Cleveland, O.
- Graham, William,
332 S. 19th st., Philadelphia, Pa.
- Grasser, John J.,
2041 Laurel st., New Orleans, La.
- Grassly, Charles W.,
802 W. 12th st., Chicago, Ill.
- Gratton, George F.,
182 Chane st., Detroit, Mich.
- Grauer, Norman A.,
Bellwood, Pa.
- Graves, John C.,
Kaufman, Tex.
- Gray, Margaret McC. (Mrs.),
3151 Washington Blvd., Chicago, Ill.
- Gray, William,
Presbyterian Hospital, Chicago, Ill.
- Green, Benjamin,
12 Market Square, Portsmouth, N.H.
- Green, Edward T.,
30-32 Platt st., New York, N. Y.
- Green, Franklin T.,
500 Devisadero st., San Fran., Cal.
- Green, Robert L.,
Univ. of N. D., Notre Dame, Ind.
- Green, Robert M.,
Green's Block, Oroville, Cal.
- Green, Walter L.,
59 S. Howard st., Akron, O.
- Greenawalt, S. Miller,
19 S. Main st., Chambersburg, Pa.
- Greenawalt, William G.,
32d st. & 7th ave., New York, N. Y.
- Greene, William R.,
1 Westminster st., Providence, R.I.
- Gregorious, George,
369 8th ave., New York, N. Y.
- Gregorious, William P.,
Bell & Park sts., Bayside, L. I., N. Y.
- Gregory, Willis G.,
530 Main st., Buffalo, N. Y.
- Greule, Albert M.,
4th & Overton sts., Newport, Ky.
- Grewe, Louis F.,
Grand ave. & Russell st., St. Louis, Mo.
- Greyer, Julius,
Vine & Findlay sts., Cincinnati, O.
- Griffen, Truman,
2547 Hennepin av., Minneapolis, Minn.
- Griffin, Lyman W.,
63 Warren ave., Boston, Mass.
- Griffith, Chas.,
306 Main st., Johnstown, Pa.
- Griffith, J. Arthur,
Residence Unknown.
- Grohman, Edward J. C.,
109 N. Main st., Butler, Pa.
- Gross, William O.,
Wash'ton & Barr sts., Ft. Wayne, Ind.
- Grover, George E.,
146 Broadway, Somerville, Mass.
- Grover, Robert O.,
Pocahontas, Ia.
- Groves, Henry C.,
68 W. Broadway, Ocala, Fla.
- Gruen, J. George,
623 Fallowfield ave., Charleroi, Pa.
- Guehring, John, Jr.,
933 Shotwell st., San Francisco, Cal.
- Guerin, James F.,
236 Front st., Worcester, Mass.
- Guerrero, Leon M.,
37 Nueva st., Ermita, Manila, P. I.
- Guest, Wilbert H.,
1158 Central ave., Los Angeles, Cal.
- Guidry, Ambrose J.,
133 N. Genois st., New Orleans, La.
- Gundrum, George,
329 W. Main st., Ionia, Mich.
- Guy, Geo. O.,
Yester Way & 2d ave., Seattle, Wash.
- Haack, Ludolph G.,
351 Adler st., Portland, Ore.
- Haddad, Saleem F.,
89 Broad st., New York, N. Y.

- Hadley, John H. C.,
300 Main st., Worcester, Mass.
- Haertlein, George H.,
830 Walnut st., Milwaukee, Wis.
- Haeseler, Loren M.,
1960 W. Madison st., Chicago, Ill.
- Hagans, Daniel A.,
2 Front st., Monroe, Mich.
- Hagar, Joseph C.,
145 High st., Boston, Mass.
- Hagee, William P.,
101 N. Main st., St. Louis, Mo.
- Hagemann, William H.,
1001 N. 5th st., Quincy, Ill.
- Hagenow, Theodore F.,
1500 Chouteau ave., St. Louis, Mo.
- Hahman, Paul T.,
1213 Exchange ave., Santa Rosa, Cal.
- Hahn, Charles W. J. H.,
2300 Salisbury st., St. Louis, Mo.
- Hahn, Edward T.,
1242 N. 53rd st., Philadelphia, Pa.
- Hahn, Philip A.,
Paris, Ark.
- Hahn, William,
105 Union St., Newton Center, Mass.
- Hain, Frank W. A.,
109 Broome st., Newark, N. J.
- Haines, William F.,
High st., Seaford, Del.
- Hale, William W.,
1810 G st., N. W., Washington, D. C.
- Hall, Joseph P.,
920 Washington Sq., Suffolk, Va.
- Hall, William A.,
177 Griswold st., Detroit, Mich.
- Hallaway, Robert R., Ph. D.,
5 Devonshire st., Carlisle, England.
- Hallenberg, Oscar,
708 Front st., Fargo, N. Dak.
- Halliburton, Orlando,
1410 Spring st., Little Rock, Ark.
- Halliday, Thomas L.,
80 E. 1st South st., Salt Lake Cy., Utah.
- Halstead, Alice L. (Mrs.),
1101 E. Front st., Muscatine, Ia.
- Hamann, William A.,
100 William st., New York, N. Y.
- Hamil, Wm. E.,
Pocahontas, Ark.
- Hamilton, Carl,
Residence unknown.
- Hammar, Alrick,
Navy Yard, Mare Island, Cal.
- Hammond, William J., Jr.,
Kosciusko, Miss.
- Hamner, Edward C.,
1113 Main st., Lynchburg, Va.
- Hamner, James F.,
Camp John Hay, Benguet, P. I.
- Hance, Anthony M.,
623 Callowhill st., Philadelphia, Pa.
- Hance, Edward H.,
Callowhill & Marshall sts., Phila., Pa.
- Hancock, James E.,
4 S. Howard st., Baltimore, Md.
- Hancock, John F.,
4 S. Howard st., Baltimore, Md.
- Hancock, Numa F.,
504 Denison st., Muskogee, Okla.
- Haney, Thomas C.,
102 E. Schiller st., Columbus, O.
- Hankey, William T.,
111 Water st., Cleveland, O.
- Hannan, Owen B.,
74 Frankford st., Cleveland, O.
- Hanser, Otto C.,
2900 Chouteau ave., St. Louis, Mo.
- Harbaugh, Wilson L.,
Haverford, Montgomery Co., Pa.
- Harbold, Curtis A.,
1820 Columbia av., Philadelphia, Pa.
- Harbold, John T.,
Pennsylvania Hosp., Philadelphia, Pa.
- Harbord, Kittie W. (Miss),
310 Commercial st., Salem, Ore.
- Hardin, John H.,
126 S. Front st., Wilmington, N. C.
- Harding, Chester E.,
1400 Acoma ave., Delta, Colo.
- Harman, Harry M.,
Bridge st., Frenchtown, N. J.
- Harms, Herman,
E & Brigham sts., Salt Lake City, Utah.
- Harrah, John W.,
1718 4th ave. S., Minneapolis, Minn.
- Harrington, Frank,
Main & Market sts., Logan, O.
- Harrington, Michael T., Jr.,
Box 25, Willows, Cal.
- Harrington, Vincent M., Jr.,
Marianna, Ark.
- Harrison, Robert L.,
3901 Williamsburg av., Richmond, Va.

- Harter, Isaac F.,
Stronghurst, Ill.
- Harter, William E.,
2375 Chippewa st., New Orleans, La.
- Hartigan, Joseph D.,
1299 Main st., Bridgeport, Conn.
- Harting, Rudolph R.,
cor. Short & Mill sts., Lexington, Ky.
- Hartwig, Otto J.,
1950 Milwaukee ave., Chicago, Ill.
- Hartz, J. D. August,
137 13th st., College Point, N. Y.
- Hartz, William T.,
301 20th st., Rock Island, Ill.
- Harvey, C. J.,
80 W. 2d South st., Salt Lake City, Utah.
- Haschenburger, Edmund O.,
1211 O st., Lincoln, Neb.
- Hassett, Thomas B.,
105 Union st., Newton Centre, Mass.
- Hassinger, Samuel E. R.,
Fairmount av. & 23d st. Phila., Pa.
- Hatcher, Robert A.,
414 E. 26th st., New York, N. Y.
- Hatton, Ellmore W.,
90 N. High st., Columbus, O.
- Hauber, Peter P.,
3203 N. Clark st., Chicago, Ill.
- Haughton, Joseph H.,
Palatka, Fla.
- Haussamen, Henry L.,
Grafton, N. Dak.
- Haussmann, Frederick W.,
1627 N. 8th st., Philadelphia, Pa.
- Havenhill, L. D.,
Lawrence, Kan.
- Hawley, Ralph W.,
Moravia, N. Y.
- Hawthorne, Herman F.,
2038 Massachu. av., Cambridge, Mass.
- Hay, Chas. L.,
Long ave. & Brady st., Du Bois, Pa.
- Hay, Edward A.,
439 Cumberland ave., Portland, Me.
- Haydock, Susannah G. (Miss),
2123 Locust st., Philadelphia, Pa.
- Hayes, Horace P.,
312 Elk st., Buffalo, N. Y.
- Haymaker, Frank B.,
316 Main st., Clarksburg, W. Va.
- Haynes, David O.,
90 William st., New York, N. Y.
- Haynes, Herbert,
159 Broadway, Providence, R. I.
- Hays, Francis B.,
100 William st., New York, N. Y.
- Headen, Claude T.,
541 Hayes st., San Francisco, Cal.
- Heaton, John C.,
Residence Unknown.
- Hebberd, Edward S.,
331 Main st., La Crosse, Wis.
- Hechler, Edward H.,
1099 Broadway, Cleveland, O.
- Hedegard, Hans C.,
3726 16th st., San Francisco, Cal.
- Hedquist, Alex.,
Provo City, Utah.
- Hedquist, Francis J.,
Provo City, Utah.
- Heebner, Charles F.,
Ontario Coll. Pharm., Toronto, Can.
- Hefton, Wallace M.,
Hanford, Kings Co., Cal.
- Heidbreder, Albert H.,
802 State st., Quincy, Ill.
- Heilman, Belle C. (Miss),
Sterling, Neb.
- Heim, Henry,
Janes av., & 3d st., Saginaw, E. S., Mich.
- Heim, William J.,
1454 N. 10th st., Philadelphia, Pa.
- Heinemann, Albert F.,
54 S. Washington st., Valparaiso, Ind.
- Heinemann, Lucy (Miss),
1103 Webster ave., Chicago, Ill.
- Heinitsh, Sigmund W.,
16 East King st., Lancaster, Pa.
- Heinritz, Lebrecht G.,
128 South st., Holyoke, Mass.
- Heinselman, Joseph A.,
Ridge & College aves., Phila., Pa.
- Heisler, John E.,
Centerville, S. Dak.
- Helfman, Joseph,
246 Seyburn ave., Detroit, Mich.
- Heller, Charles T.,
33 W. 10th st., St. Paul, Minn.
- Hellmuth, Joseph A.,
2148 N. Robey st., Chicago, Ill.
- Hemm, Francis,
3854 Arsenal st., St. Louis, Mo.
- Hengst, J. Edwin,
Gay st. & Central av., Baltimore, Md.

- Henkel, Alice (Miss),
U. S. Dept. Agric., Washington, D.C.
- Henkel, Charles B.,
Md. av. & Prince George, Annapolis, Md.
- Henning, Adolph,
137 Water st., New York, N. Y.
- Henriques, Adolph,
4726 Prytania st., New Orleans, La.
- Henry, Frank C.,
703 15th st. N.W., Washington, D.C.
- Henry, Samuel C.,
508 S. 61st st., Philadelphia, Pa.
- Hepburn, John,
103 Main st., Flushing, N. Y.
- Herbst, William P.,
2500 Penna. av. N.W., Wash'ton, D.C.
- Hereth, Frank S.,
c. o. Eli Lily & Co., Indianapolis, Ind.
- Hermanek, Joseph C.,
1800 Centre ave., Chicago, Ill.
- Herpich, John L.,
166 E. Main st., Columbus, O.
- Herrera, Francisco,
85 Cuba st., Havana, Cuba.
- Herron, Charles S.,
St. Mary's, Pa.
- Herty, Frank J.,
U. S. M. Hosp., Mobile, Ala.
- Hess, Nicholas A.,
27 S. Fulton ave., Baltimore, Md.
- Hess, Paul L.,
Independ. & Forest av., Kansas Cy, Mo.
- Heuisler, Philip L.,
308-310 W. Lombard st., Balto., Md.
- Heydenreich, Emile,
30 N. William st., New York, N.Y.
- Heyl, James B.,
Vice-Consul, Hamilton, Bermuda.
- Hickerson, William H.,
Warren, Huntingdon Co., Ind.
- Hickox, Milton,
Dallas, Tex.
- Hicks, John E. F., P. C.,
34 Cone st., Atlanta, Ga.
- Highfield, Herbert M.,
227 N. 7th st., Zanesville, O.
- Hill, Aubrey T.,
303 W. Pratt st., Baltimore, Md.
- Hill, Warren B.,
426 Caswell Block, Milwaukee, Wis.
- Hilpert, Willis S.,
543 E. 34th st., Chicago, Ill.
- Hilton, Samuel L.,
1033 22d st. N.W., Washington, D.C.
- Hindes, Joseph F.,
Relay, Balto. Co., Md.
- Hindle, William P.,
987 Main st., Bridgeport, Conn.
- Hindman, Finis,
523 120th st., Herrin, Ill.
- Hiner, Virgil,
Mt. Vernon, S. Dak.
- Hires, Lewis M.,
Riverside, N. J.
- Hirseman, Felix,
282 City Island ave., New York, N. Y.
- Hitchcock, Charles H.,
150 Huntington ave., Boston, Mass.
- Hitchcock, George H.,
cor. 6th av. & 58th st., New York, N.Y.
- Hitchcock, John E.,
Custom House Sq., Plattsburgh, N. Y.
- Hoburg, William A., Jr.,
1292 Nostrand ave., Brooklyn, N.Y.
- Hoch, Aquilla,
543 E. Thompson st., Phila., Pa.
- Hoch, Quintus,
2429 Frankford ave., Phila., Pa.
- Hodges, Jesse D.,
Gibson Drug Co., Little Rock, Ark.
- Hodgson, Joseph A.,
1129 Chapel st., New Haven, Conn.
- Hodson, Eugene W.,
101 E. Baltimore st., Baltimore, Md.
- Hoechstetter, Max S.,
31 McClure av., N.S., Pittsburg, Pa.
- Hoffelt, Edward,
Estelline, S. Dak.
- Hoffmann, George F.,
Pesotum, Ill.
- Hoffman, George L.,
321 Fourth st., Logansport, Ind.
- Hoffman, Geo. W.,
321 Fourth st., Logansport, Ind.
- Hogaboom, George A.,
703 Central ave., Hot Springs, Ark.
- Hogan, John M.,
18th & Jackson ave., Kansas City, Mo.
- Hohmann, George,
751 Courtland ave., New York, N. Y.
- Holliday, Francis E.,
81 Fulton st., New York, N. Y.
- Holloway, Jesse D.,
113 Sixth st., East Liverpool, O.

- Holm, Marinus L.,
c.o. State B'd Health, Lansing, Mich.
- Holmes, Clay W.,
410 W. Gray st., Elmira, N. Y.
- Holmes, Henry E.,
209 Third ave., S., Seattle, Wash.
- Holsopple, J. Bert,
759 Montclair st., Pittsburg, Pa.
- Holt, Edwin M.,
Quarantine, La.
- Holverson, Henry T.,
Alexandria, Minn.
- Holzhauser, Charles,
787 Broad st., Newark, N. J.
- Holzhauser, Charles W.,
787 Broad st., Newark, N. J.
- Hood, Charles L.,
Merrimac & Central sts., Lowell, Mass.
- Hood, Harry A.,
1622 West End av., Chicago Heights, Ill.
- Hoover, George W.,
Bureau of Chem., Washington, D.C.
- Hope, Robert L.,
Centralia, Mo.
- Hopkins, Jesse L.,
Woodbridge Bldg., New York, N.Y.
- Hopp, Lewis C.,
1104 Euclid ave., Cleveland, O.
- Horlick, Alex. J.,
Horlick Food Co., Racine, Wis.
- Horn, Wilbur F.,
32 W. Main st., Carlisle, Pa.
- Horne, Warren W.,
23 Hay st., Fayetteville, N. C.
- Horton, Charles H.,
809 N. Jefferson ave., St. Louis, Mo.
- Horwitz, Leon,
2044 Wylie ave., Pittsburg, Pa.
- Hottinger, Otto G.,
801 Milwaukee ave., Chicago, Ill.
- Houck, David L.,
6th & Philad'a sts., Indiana, Pa.
- Houghton, E. Mark,
130 Longfellow ave., Detroit, Mich.
- Hover, William A.,
1437 Lawrence st., Denver, Colo.
- Howard, Fletcher (Mrs),
401 S. Grand ave., Los Angeles, Cal.
- Howard, Henry,
Brookeville, Md.
- Howell, Edward V.,
Univ. Drug Co., Chapel Hill, N. C.
- Howson, Arthur B.,
Paint & Main sts., Chillicothe, O.
- Hubbard, Fred. A.,
425 Center st., Newton, Mass.
- Huber, Jos. A.,
Louisville, Colo.
- Huder, Henry J.,
52 E. Wash'ton st., Indianapolis, Ind.
- Hudnut, Richard A.,
44 E. 19th st., New York, N. Y.
- Hudson, Arthur,
265 Washington st., Newton, Mass.
- Hudson, John R.,
135 Prospect st., Waltham, Mass.
- Huegel, Henry O. A.,
1468 S. Grand ave., St. Louis, Mo.
- Husted, Alfred B.,
Delmar, Albany Co., N. Y.
- Hughes, Francis S.,
15th & Oxford sts., Philadelphia, Pa.
- Hughes, James A.,
19th st. & Chester av., Bakersfield, Cal.
- Hughes, John R.,
Columbia, S. Dak.
- Huhn, Charles H.,
98 Western ave., Minneapolis, Minn.
- Hummel, John A.,
New Madrid, New Madrid Co., Mo.
- Humphreys, Charles J.,
602 Prospect av., Hot Springs, Ark.
- Humphreys, George H.,
415 Tchonitonta st., New Orleans, La.
- Hund, George B.,
San Anselmo, Cal.
- Hunsberger, Ambrose,
416 S. 15th st., Philadelphia, Pa.
- Hunt, Byrd H.,
502 Prospect av., Hot Springs, Ark.
- Hunt, Reid,
Hyg. Lab., P.H. & M.H.S., Wash'ton, D.C.
- Hunter, Angus,
c.o. El Paso Drug Co., El Paso, Tex.
- Huntley, Clyde G.,
Oregon City, Ore.
- Hurd, John C.,
26 Market st., Somersworth, N. H.
- Hurlbert, William A.,
5 Central st., Provincetown, Mass.
- Hurlebaus, George W.,
2030 14th st. N.W., Washington, D.C.
- Hurley, Horace O.,
2326 3d st., Louisville, Ky.

- Hurley, John,
 507 Main st., Little Falls, N. Y.
 Hurty, John N.,
 104 N. Penn st., Indianapolis, Ind.
 Huston, Thos. W.,
 Summit & Madison aves., Toledo, O.
 Hutton, Major E.,
 426 N. 2nd st., Nashville, Tenn.
 Hyde, Byron M.,
 202 Main st. E., Rochester, N. Y.
 Hyde, Joseph B., Jr.,
 141 Broad st., Charleston, S. C.
 Hynson, Henry P.,
 423 N. Charles st., Baltimore, Md.
 Ihhardt, William K.,
 4836 Delmar Blvd., St. Louis, Mo.
 Iltis, George W., Phar. D.,
 U. S. M. Hospital, Pittsburg, Pa.
 Impey, William F.,
 Tulsa, Okla.
 Irvine, Ephraim D.,
 357 Dearborn st., Chicago, Ill.
 Isakovics, Alois von,
 Monticello, N. Y.
 Ittner, William F.,
 2301 S. Grand ave., St. Louis, Mo.
 Jackman, Wilbur F.,
 Orono, Me.
 Jackson, Hugh C.,
 622 Congress ave., Austin, Tex.
 Jacobs, Charles C.,
 Independencia 93, Sancti Spiritus, Cuba.
 Jacobson, William F.,
 409 S. Main st., Los Angeles, Cal.
 Jacques, George W.,
 Broadway & Augusta st., S. Amboy, N. J.
 Jamieson, George A.,
 816 North ave., Bridgeport, Conn.
 Jamieson, Thomas N.,
 4508 Woodlawn ave., Chicago, Ill.
 Jeffrey, Frank D.,
 503 Park ave., Hot Springs, Ark.
 Jehlik, Anton J.,
 3401 W. 26th st., Chicago, Ill.
 Jelinek, John P.,
 295 W. 7th st., St. Paul, Minn.
 Jelton, Louis McK.,
 Grand ave. & Ervay st., Dallas, Tex.
 Jennings, Algernon C.,
 108 Ouachita st., Hot Springs, Ark.
 Jensen, Gerhard H.,
 6619 Ellis ave., Chicago, Ill.
 Jensen, Peder,
 Fern Hill, Tacoma, Wash.
 Jesson, Jacob,
 Euclid ave., Ontario, Cal.
 Joergensen, Sophus,
 Com. st., La Conner, Skagit Co., Wash.
 Johann, Adam E.,
 827 W. Main st., Richmond, Va.
 John, Milo Jesse,
 247 5th ave., Clinton, Ia.
 Johnson, Alfred J., Jr.,
 386 Main st., Pawtucket, R. I.
 Johnson, Charles W., Ph. D.,
 5031 15th ave. N.E., Seattle, Wash.
 Johnson, Edward F.,
 53 N. Monterey st., Gilroy, Cal.
 Johnson, John C.,
 Jefferson st. & Salem av., Roanoke, Va.
 Johnson, Joy H.,
 80 W. 2nd South st., Salt Lake, Utah.
 Johnson, Lewis,
 Silverton, Ore.
 Johnson, Manuel,
 50 Obispo st., Havana, Cuba.
 Johnson, Marcy Marion,
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 27 Court st., Auburn, Me.
 Jones, Simon N.,
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- Kaiser, Herman W.,
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- Kearfott, Clarence P.,
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- Keemer, Edgar B.,
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4 Lake st., Lake Preston, S. D.
- Keller, Alfred J.,
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- Kelley, Chas. S.,
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 Lehman, Chas. N.,
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- Merrell, George R.,
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- Metzger, Arthur S.,
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- Meyer, Frederick H.,
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- Michaelis, Gustavus,
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- Potts, Thomas H.,
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 Vose, George E.,
 65 Elm st., Waterville, Me.
 Voss, Edward, Jr.,
 1201 Vine st., Cincinnati, O.
 Votteler, William,
 Shelby & Oak sts., Louisville, Ky.
 Vowell, Louis S.,
 62 S. Main st., Washington, Pa.
 Vredenburg, Bruce,
 502 Pearl st., Beaumont, Tex.
 Waddell, Minor T.,
 1207 Ash st., Indianapolis, Ind.
 Wagner, Arthur C.,
 231 Belmont st., Everett, Mass.
 Wagner, Louis,
 Mountain View, Cal.
 Wakeman, Nellie A. (Miss),
 706 State st., Madison, Wis.
 Walbridge, Cyrus P.,
 4th & Market sts., St. Louis, Mo.
 Walker, Alfred,
 Sutton, W. Va.
 Walker, Elias R.,
 R. F. D. No. 1, Flora, Tenn.

- Walker, Joseph P.,
Charity Hospital, New Orleans, La.
- Walker, Robert,
756 Bank st., Waterbury, Conn.
- Walker, Robert H.,
Gonzales, Tex.
- Walker, William A.,
127 West Georgia st., Indianapolis, Ind.
- Walker, William A.,
cor. Main & Water sts., Castine, Me.
- Wall, Otto A.,
4532 Virginia ave., St. Louis, Mo.
- Wallace, John C.,
61 E. Washington st., New Castle, Pa.
- Walsdorf, Edw. H.,
Peters & Magazine, New Orleans, La.
- Walter, Peter G.,
Chestnut & Liberty sts., Pittsburg, Pa.
- Walton, Lucius L.,
50 W. Fourth st., Williamsport, Pa.
- Walz, J. Lee,
1103 W. Lanvale st., Baltimore, Md.
- Ward, A. Jae,
General Delivery, Denver, Colo.
- Ward, Chas. H.,
41 N. Fair Oaks av., Pasadena, Cal.
- Ward, Enoch J.,
Front st., Ellisville, Miss.
- Ward, Francis W.,
15 S. Main st., Memphis, Tenn.
- Ward, Herbert,
El Paso, Tex.
- Ward, Homer B.,
Rowland, N. C.
- Wardle, Arthur S.,
1-3 Warren st., Hudson, N. Y.
- Ware, Charles H.,
1930 Madison ave. Baltimore, Md.
- Ware, Clarence W.,
Abercrombie, N. Dak.
- Warfield, James A.,
Washington, Guernsey Co., O.
- Warn, William E.,
Lock Box 342, Keyport, N. J.
- Warner, Francis D.,
137 E. Michigan st., New Carlisle, Ind.
- Warner William R.,
Main st., Vergennes, Vt.
- Warner, William R., Jr.,
639 N. Broad st., Philadelphia, Pa.
- Warren, Lee,
2703 Montana av., Billings, Mont.
- Warren, Lewis E., B. S.,
1108 Garfield ave., Chicago, Ill.
- Warren, Robert A.,
Clarksville, Ark.
- Washburn, Homer C.,
Norman, Okla.
- Waterhouse, Joseph T.,
1 Lincoln st., Newton Highlands, Mass.
- Watkins, Charles W.,
227 S. Illinois st., Indianapolis, Ind.
- Watson, George,
Southport, N. C.
- Watson, George N.,
808 Alabama st., Lawrence, Kan.
- Watson, Herbert K.,
803 Market st., Wilmington, Del.
- Watson, Joseph R.,
330 18th ave., N., Seattle, Wash.
- Watson, William, Jr.,
202 Genesee st., Utica, N. Y.
- Watt, George H.,
Pullman, Wash.
- Watters, Alexander J.,
266 E. Fifth st., Los Angeles, Cal.
- Waugh, George J.,
Ontario st., Stratford, Ont., Can.
- Weaber, John A.,
209 S. El Paso st., El Paso, Tex.
- Weaver, Clarence A.,
973 Trumbull av., Detroit, Mich.
- Webb, Edward N.,
277 E. 14th ave., Columbus, O.
- Webb, John W.,
Main st., Stuttgart, Ark.
- Weber, Don C.,
Arlington, Neb.
- Weed, Nelson,
411 S. Front st., Mankato, Minn.
- Weicker, Theodore,
78-80 Beekman st., New York, N. Y.
- Weidemann, Charles A.,
2148 Green st., Philadelphia, Pa.
- Weidemann, George B.,
2148 Green st., Philadelphia, Pa.
- Weilbaeher, Frank E.,
6056 Hurst av., New Orleans, La.
- Weimar, Henry,
122 Central ave., Hot Springs, Ark.
- Weinstein, Abraham,
696 Union ave., New York, N. Y.
- Weinstein, Joseph,
1771 Madison ave., New York, N. Y.

- Weiser, William P.,
 501 Market st., Camden, N. J.
 Weisner, Nicholas E.,
 2349 Germantown av., Phila., Pa.
 Weiss, Conrad H.,
 25 Monroe st., Anacostia, D. C.
 Weiss, Emil O.,
 794 6th ave., New York, N. Y.
 Weiss, William J.,
 424 Baxter ave., Louisville, Ky.
 Wellcome, Henry S.,
 Snow Hill Bldgs., London E.C., Eng.
 Weller, Frank P.,
 755 8th st. S. E., Washington, D. C.
 Wells, Jas. H.,
 241 Fifth ave., Chicago, Ill.
 Welsh, Joseph B.,
 3616a Botanical ave., St. Louis, Mo.
 Wendel, H. Edward,
 Box 181, Sea Isle City, N. J.
 Wendt, William C.,
 366 S. 4th st., Columbus, O.
 Wenzell, William T.,
 U.S. Appraiser's Office, San Fran., Cal.
 Werckshagen, Otto,
 258 W. Biddle st., Baltimore, Md.
 Werner, Rudolf C.,
 P. O. Box 204, Freeport, N. Y.
 Werner, Wm. F.,
 2202 E. 10th st., Indianapolis, Ind.
 Wesner, Henry C.,
 Windsor, Henry Co., Mo.
 West, Benjamin F.,
 4759 14th av., N.E., Seattle, Wash.
 West, Charles A.,
 14 Fulton st., Boston, Mass.
 West, Fred.,
 Dept. Public Health, San Francisco, Cal.
 Westby, Severs,
 679 E. 3d st., St. Paul, Minn.
 Westcott, James W.,
 423 N. Charles st., Baltimore, Md.
 Westfall, Paul,
 Oklahoma City, Okla.
 Westmoreland, Edwin R.,
 Lockhart, Tex.
 Wetterstroem, Theodore D.,
 3935 Spring Grove av., Cincinnati, O.
 Weydell, K. Albus,
 6501 Cottage Grove av., Chicago, Ill.
 Wheeler, A. Alton,
 270 Woodward ave., Detroit, Mich.
 Wheeler, Carlton B.,
 18 Main st., Hudson, Mass.
 Wheeler, William D.,
 Sharon, Mass.
 Whelan, Wm. F.,
 844 Ellicott Sq., Buffalo, N. Y.
 Whelpley, Henry M.,
 2342 Albion Place, St. Louis, Mo.
 Whilden, Charles B.,
 1727 Pine st., San Francisco, Cal.
 Whitaker, William H.,
 102 Ferry st., Malden, Mass.
 White, Charles H.,
 153 E. 51st st., New York, N. Y.
 White, Joseph L.,
 928 New York ave., Wash'ton, D. C.
 White, Robert C.,
 412 S. 13th st., Philadelphia, Pa.
 White, Robin H.,
 70 Main st., Mt. Sterling, Ky.
 White, Wm. R.,
 314 Hancock st., Nashville, Tenn.
 Whitehead, Bower T.,
 Brookings, S. Dak.
 Whitfield, Thomas,
 362 Wabash ave., Chicago, Ill.
 Whitney, David V.,
 3722 E. 12th st., Kansas City, Mo.
 Whittington, Wm. G.,
 262 Central av., Hot Springs, Ark.
 Whittle, Wm. A.,
 308 W. Lombard st., Baltimore, Md.
 Whittlesey, H. H.,
 Pocatello, Idaho
 Whitworth, Frank E.,
 775 E. 2d South st., Salt Lake, Utah
 Whorton, Carl,
 5th & Chestnut sts., Gadsden, Ala.
 Whyte, Robert M.,
 19 W. 125th st., New York, N. Y.
 Wicarius, Max J.,
 4861 Cudahy ave., Hawthorne, Ill.
 Wich, Henry E.,
 1230 N. Stricker st., Baltimore Md.
 Wicker, Judson A.,
 14 School st., Brockton, Mass.
 Wickham, William H.,
 91 Fulton st., New York, N. Y.
 Widrig, Louis C.,
 5th & Columbia sts., New York, N. Y.
 Wiggan, Harry C.,
 14 Fulton st., Boston, Mass.

- Wilbert, Martin I.**,
 1621 35th st. N.W., Washington, D.C.
Wilbur, Lot,
 Ave. C & 1st st., Snohomish, Wash.
Wilcox, Levi,
 22 Mitchell ave., Waterbury, Conn.
Wiley, Harvey W.,
 Dept. of Agriculture, Wash'ton, D. C.
Willard, Rowland,
 131 E. Main st., Haddonfield, N. J.
Willets, Charles E.,
 Grand ave., Mars, Pa.
Williams, Arthur R.,
 Langford, S. Dak.
Williams, Berry,
 S. Broadway & E. Irwin st., Tyler, Tex.
Williams, Edward,
 1 West Main st., Madison, Wis.
Williams, George G.,
 99 North st., Boston, Mass.
Williams, J. Lewis,
 Three Rivers, Que., Can.
Williams, Lawrence S.,
 1801 Riggs ave., Baltimore, Md.
Williams, Seward W.,
 c. o. Bauer & Black, Chicago, Ill.
Williamson, R. E. L.,
 1401 N. Charles st., Baltimore, Md.
Willis, Roland M.,
 Celina, Tex.
Willman, Wm. G.,
 Adams st., Brownsville, Tex.
Willson, George A.,
 106 Branch st., Lowell, Mass.
Wilson, Benjamin O.,
 46 Canal st., Boston, Mass.
Wilson, Charles F., Ph. G.,
 200 E. 31st st., Chicago, Ill.
Wilson, Frederick H.,
 82 Main st., Brunswick, Me.
Wilson, George B.,
 833 W. 6th st., Los Angeles, Cal.
Wilson, George T.,
 Bowling Green, Ky.
Wilson, Henry B.,
 220 Denrock ave., Dalhart, Tex.
Wilson, Lincoln,
 3973 Tennyson st., Denver, Colo.
Wilson, Richard B.,
 2221 W. Adams st., Chicago, Ill.
Wilson, William H.,
 781 Park ave., New York, N. Y.
- Wimmer, Curt P.**,
 115 W. 68th st., New York, N. Y.
Winberg, Washington W.,
 5100 Lake av., Chicago, Ill.
Wingo, Daniel M.,
 Vivian, La.
Winkelman, John H.,
 118 W. Lombard st., Baltimore, Md.
Winslow, Edwards F., Phar. D.,
 2420 Calow ave., Baltimore, Md.
Winter, Carl,
 2812 E. 79th st., Cleveland, O.
Winter, Jas. H.,
 1375 Valencia st., San Francisco, Cal.
Wirth, Adam,
 618 St. Charles st., New Orleans, La.
Wirthman, J. George,
 1535 Grand ave., Kansas City, Mo.
Wirthman, Joseph C.,
 18th st. & Troost av., Kansas City, Mo.
Wittich, Matthew H.,
 1519 E. Franklin av., Minneapolis, Minn.
Witting, Frederick F.,
 Longmont, Colo.
Wittmer, Joseph W.,
 1347 Clay st., Dubuque, Ia.
Woehner, Frederick A.,
 Drawer V, Great Falls, Mont.
Wolf, Charles A.,
 Broadway & Bank sts., Baltimore, Md.
Wolf, J. Carlton,
 2207 E. Pratt st., Baltimore, Md.
Wolf, Michael F.,
 Eastern av. & Chester st., Balto., Md.
Wolff, Daniel O.,
 278 Dartmouth st., Boston, Mass.
Wolff, Edward H.,
 522 Washington ave., St. Louis, Mo.
Woltereck, Gustav,
 628 E. Eager st. Baltimore, Md.
Woltersdorf, Louis,
 717 Ashland Blvd., Chicago, Ill.
Wood, Alonzo F., Jr.,
 2 Church st., New Haven, Conn.
Wood, Horatio C., Jr.,
 3842 Walnut st., Philadelphia, Pa.
Wood, James P.,
 2 Church st., New Haven, Conn.
Wood, John W.,
 494 Broadway, Newport, R. I.
Wood, Richard A.,
 St. Michael, Alaska.

- Wood, William H.,
Sanford, Me.
- Woodbury, Frank A.,
Maverick Square, East Boston, Mass.
- Woodford, Carlos H.,
105 Jackson st. Allegheny, Pa.
- Woodhall, Frederick,
30 Park Place, Rockville, Conn.
- Woodman, Walter I.,
217 Bellevue st., Newton, Mass.
- Woodruff, Roderick S.,
92 Prospect st., Waterbury, Conn.
- Woodward, Albert A.,
Aberdeen, S. Dak.
- Woodworth, Benjamin S.,
1002 W. Wayne st., Fort Wayne, Ind.
- Woolsey, Jesse F.,
c. o. Strong, Cobb & Co., Cleveland, O.
- Wooten, Thomas V.,
87 Lake st., Chicago, Ill.
- Wooyenaka, Keizo,
564 W. 173d st., New York, N. Y.
- Worth, Thomas R.,
Main st., Sebastopol, Cal.
- Wrensch, Henry E., Jr.,
610 Bloomfield ave., Montclair, N. J.
- Wright, Billie C.,
4800 Charlotte st., W. Nashville, Tenn.
- Wright, James T.,
22 Washington Sq., Newport, R. I.
- Wuensch, Charles,
494 Springfield ave., Newark, N. J.
- Wulling, Frederick J.,
Minn. University, Minneapolis, Minn.
- Wunderlich, Edward,
1415 Dryades st., New Orleans, La.
- Wurdack, John H.,
1548 Wylie ave., Pittsburg, Pa.
- Wyckoff, Elmer E.,
246 E. 5th st., Brooklyn, N. Y.
- Yellig, Daniel C.,
308 Summit st., Pittsburg, Pa.
- Yeomans, Sidney C.,
3360 State st., Chicago, Ill.
- Yorston, Matthew M.,
1063 Central ave., Cincinnati, O.
- Young, Clarence C.,
735 Church st., Nashville, Tenn.
- Young, David B.,
96 Lincoln ave., Bellevue, Pa.
- Young, George O.,
Buckhannon, W. Va.
- Young, James J.,
Okolona, Ark.
- Yunker, Charles H.,
Main st., Charleston, Ark.
- Zamora, Manuel,
162 St. Sebastian st., Quiapo, Manila, P. I.
- Zane, Ralph R.,
893 Ashbury st., San Francisco, Cal.
- Zbinden, David H.,
528 S. 5th ave., Nashville, Tenn.
- Zbinden, Harold F.,
1400 Woodland ave., Nashville, Tenn.
- Zeamer, Harry W.,
240 Locust st., Columbia, Pa.
- Zeledon, Jose A.,
San José, Cost Rica, C. A.
- Zeman, Ott,
3909 W. 26th st., Chicago, Ill.
- Zieffle, Adolph,
N. Dak. Agric. Coll., Fargo, N. Dak.
- Ziegler, Howard P.,
201 Windsor st., Reading, Pa.
- Ziegler, Philip M.,
526 Penn st., Reading, Pa.
- Zieske, Arthur,
214 1st av., S. W., Watertown, S. Dak.
- Zimmer, Harry E.,
13 E. Wash'ton st., Indianapolis, Ind.
- Zinn, Chas. E.,
300 W. Ninth st., Kansas City, Mo.
- Zoeller, Edward V.,
Main st., Tarboro, N. C.
- Zottman, William H.,
1 Church st., Burlington, Vt.
- Zuenkeler, J. Ferd.,
1902 Vine st., Cincinnati, O.
- Zurawski, Narcys J.,
4800 S. Loomis st., Chicago, Ill.

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-
PAYMENT OF DUES ACCORDING TO ARTICLE III,
CHAPTER VIII, OF THE BY-LAWS.

(PUBLISHED IN ACCORDANCE WITH A GENERAL RULE ADOPTED AT MONTREAL, CAN.,
AUGUST, 1896. SEE PAGE 17, VOL. 44, PROCEEDINGS.)

	Residence.	Elected.
Abernethy, John C.,	Miami, Fla.,	1904
Allen, Andrew C.,	Ashtabula, O.,	1905
Bachelle, Rudolph von,	Chicago, Ill.,	1906
Baigent, John T.,	Columbus, O.,	1906
Blahnik, Venzel L.,	Chicago, Ill.,	1907
Brashear, Owen L.,	Bristol, Tenn.,	1906
Brightwell, Newton E.,	Pine Bluff, Ark.,	1908
Browning, Ernest R.,	Hot Springs, Ark.,	1908
Bunting, George A.,	Baltimore, Md.,	1907
Burke, Walter J.,	Clinton, Mass.,	1907
Butsch, John L.,	Baltimore, Md.,	1906
Chantler, Vincent H.,	Chicago, Ill.,	1906
Caine, S. Lee,	Columbus, Miss.,	1904
Cajulis y Samedra, Felix,	Residence Unknown.	1907
Collins, Mary E.,	Residence Unknown.	1902
Conger, Stephen B.,	St. Paul, Minn.,	1907
Craft, Oliver A.,	Hot Springs, Ark.,	1907
Crawford, Joseph,	Philadelphia, Pa.,	1903
Crowdle, John E.,	Newton, Mass.,	1894
Dawson, Chas. H.,	Little Rock, Ark.,	1907
Dawson, Edward B.,	Shadyside, O.,	1907
Day, Edward J.,	Fitchburg, Mass.,	1901
Deming, William A.,	Hot Springs, Ark.,	1907
Dohme, William F.,	Montclair, N. J.,	1907
Donohue, Henry,	San Francisco, Cal.,	1903
Dow, John C.,	Residence Unknown,	1907
Duble, Jesse B.,	New York, N. Y.,	1904
Elliott, Chas. H.,	Washington, D. C.,	1899
Ellis, William H.,	Hot Springs, Ark.,	1907
Eppstein, Jacob,	Residence Unknown,	1902
Friesenecker, Chas. M.,	Chicago, Ill.,	1907
Forsythe, William K.,	Chicago, Ill.,	1902
Golaz, Ernest H.,	Dallas, Tex.,	1907
Gordon, William C.,	Wheeling, W. Va.,	1905
Graham, Abner B.,	Mishawaka, Ind.,	1907
Graham, Karl H.,	Residence Unknown,	1907
Grazer, Frederick A.,	San Francisco, Cal.,	1904
Hackenberger, George W.,	New York, N. Y.,	1907
Haeger, Fred,	Chicago, Ill.,	1906
Harkany, Samuel,	New York, N. Y.,	1907
Heiss, Ernest J.,	Chicago, Ill.,	1907
High, Raymond L.,	Philadelphia, Pa.,	1902
Hodson, Daniel F.,	Chicago, Ill.,	1907
Holt, Lewis H., Jr.,	Nashville, Tenn.,	1907

Hood, William D.,	Kinston, N. C.,	1905
Howard, Sam. A.,	Fort Smith, Ark.,	1907
Hull, Ralph W.,	Chicago, Ill.,	1905
Hunt, Byrd H.,	Hot Springs, Ark.,	1907
Huston, Thomas B.,	Toledo, O.,	1904
Ink, Chas. E.,	Columbiana, O.,	1885
Irvine, Darwin W.,	Salt Lake City, Utah,	1902
Jackson, Chas. H.,	Atlantic City, N. J.	1907
Janssen, Jacob S.,	Milwaukee, Wis.,	1903
Johnson, Marcy M.,	Vandalia, Mo.,	1907
Johnstone, J. C.,	Chicago, Ill.,	1907
Jones, James T.,	South Boston, Mass.,	1875
Kalkman, Henry A.,	Newport, R. I.,	1907
Karg, George,	Chicago, Ill.,	1907
Kelley, Reuben B.,	Atlanta, Ga.,	1905
Kempf, Fred. F.,	Aurora, Ill.,	1907
Kendall, Wallace W.,	Superior, Neb.,	1903
Kester, Joseph A.,	Onaga, Kan.,	1904
King, Jacob H. C.,	Hot Springs, Ark.,	1907
Kuder, William F.,	Cleveland, O.,	1893
Larrabee, Chas. W.,	Revere, Mass.,	1906
Lembke, Carl H. F.,	Toledo, O.,	1907
Lemly, Chas. C.,	Hot Springs, Ark.,	1907
Light, Isam M.,	Chicago, Ill.,	1907
Lillich, Bert A.,	Baltimore, Md.,	1907
Loesser, Paul A.,	Toledo, O.,	1906
Marsden, Joshua E.,	Philadelphia, Pa.,	1906
Mata y Acosta, Joaquin,	Havana, Cuba,	1907
McBride, Chas. R.,	Memphis, Tenn.,	1904
McClerkin, Felix W.,	Little Rock, Ark.,	1907
McCoy, James E.,	New York, N. Y.,	1907
McDonald, Harry S.,	New Albany, Ind.,	1905
McGee, George,	Detroit, Mich.,	1907
McVay, Ernest A.,	Chicago, Ill.,	1906
Mehl, Henry W.,	Leavenworth, Kan.,	1905
Mix, Willis L.,	New Haven, Conn.,	1896
Morris, Richard G.,	Hot Springs, Ark.,	1907
Muchnic, Adolph M.,	Pittsburg, Pa.,	1905
Musselman, Claude J.,	Paris, Tex.,	1906
Neal, Thomas L.,	Medford, Okla.,	1904
Newlon, Howard M.,	Los Angeles, Cal.,	1907
Newton, Clarke H. W.,	Waterbury, Conn.,	1905
Niethammer, Otto F.,	Chicago, Ill.,	1905
Oliveros, Sidney A.,	Tryon, N. C.,	1907
Ortenstein, Harry M.,	Chicago, Ill.,	1906
Padron, Thomas,	Havana, Cuba,	1907
Pedroso, Manuel,	Havana, Cuba,	1907
Perdue, William L.,	Residence Unknown,	1907
Perry, Frank V.,	St. Louis, Mo.,	1907
Pfaff, Edward F.,	New York, N. Y.,	1907
Pfaff, Henry, Jr.,	Chicago, Ill.,	1907

LIST OF MEMBERS WHO HAVE RESIGNED.

1425

Phillips, William R.,	Residence Unknown,	1908
Pierce, Fred,	St. Joseph, Mo.,	1903
Posey, Henry G.,	New Orleans, La.,	1905
Pratt, Thomas M.,	Cleveland, O.,	1906
Puig, Juan E.,	Havana, Cuba,	1907
Quirk, Edmond C., Jr.,	New Iberia, La.,	1904
Rapport, George L.,	Hartford, Conn.,	1907
Rauschkolb, John,	Columbus, O.,	1894
Renfro, Harris B.,	Meridian, Miss.,	1904
Rogers, Arthur H.,	Geneseo, N. Y.,	1882
Rogers, Ora L.,	Kalona, Ia.,	1907
Rounds, Marvin B. C.,	Chicago, Ill.,	1905
Rozene, Robert P. M.,	Phoenix, Ariz.,	1904
Ryder, Louis W.,	Washington, D. C.,	1907
Sacks, Bernard,	New York, N. Y.,	1907
Salchert, H. A.,	Chicago, Ill.,	1906
Schaper, Henry F.,	Chicago, Ill.,	1905
Schmitt, Carl,	Cleveland, O.,	1906
Schneider, Benjamin,	Pullman, Wash.,	1907
Schneider, Carl H.,	Orion, Ill.,	1906
Sheehan, John S.,	Memphis, Tenn.,	1907
Simon, Frank,	Oakland, Neb.,	1907
Smith, Rufus E.,	Syracuse, N. Y.,	1907
Steyh, George P.,	Seattle, Wash.,	1907
Troxler, Robert F.,	Evansville, Ind.,	1902
Waldner, Paul J.,	Washington, D. C.,	1900
Wallhann, Carl G.,	Yankton, S. Dak.,	1907
Walter, Chas. A.,	Oak Park, Ill.,	1899
Warner, Louis H.,	Brooklyn, N. Y.,	1907
Wescott, William C.,	Atlantic City, N. J.,	1896
Wheatcroft, John C.,	Grayville, Ill.,	1906
White, Albert J.,	Dalton, O.,	1907
Wilkes, George R.,	Memphis, Tenn.,	1907
Williams, Walter G.,	Charlotte C. H., Va.,	1905
Williamson, Wyley P.,	Chicago, Ill.,	1907
Willis, Henry,	Quebec, Can.,	1897
Young, Harry G.,	Residence Unknown,	1908
Zabaldano, Alexander,	San Francisco, Cal.,	1902
Zelinski, Walter F. von,	Chicago, Ill.,	1905

LIST OF MEMBERS WHO HAVE RESIGNED SINCE PUBLICATION
OF THE LAST REPORT.

	Residence.	Elected.
Baldauf, Julius L.,	Henderson, Ky.,	1907
Baltzly, Zachary T.,	Massilon, O.,	1905
Baughman, Leo M.,	Los Angeles, Cal.,	1907
Bechberger, Henry,	Cleveland, O.,	1904
Becker, Maxwell M.,	Philadelphia, Pa.,	1909
Bell, Emil R.,	Louisville, Ky.,	1890

Bell, S. Howard,	West Derry, N. H.,	1890
Best, Samuel M.,	Mattapan, Boston, Mass.,	1906
Bivins, Elliott A.,	Seattle, Wash.,	1909
Boldt, Fred W.,	Cleveland, O.,	1905
Bond, J. Emory,	Roland Park, Md.,	1907
Brown, William H.,	Chicago, Ill.,	1910
Burke, William T.,	Philadelphia, Pa.,	1906
Craighill, Edward A.,	Lynchburg, Va.,	1909
Craw, Eugene E.,	Sadorus, Ill.,	1908
Curry, David W.,	Rome, Ga.,	1894
De Reeves, Antonio E.,	Baltimore, Md.,	1909
Dean, Augustus W.,	Waverly, O.,	1908
Dresser, George E.,	Putnam, Conn.,	1886
Evans, William J.,	New York, N. Y.,	1908
Fairchild, William F.,	Placerville, Cal.,	1909
Fearis, Burvadis W.,	Waxahachie, Tex.,	1909
Finninger, Paul E.,	Chicago, Ill.,	1906
Forrest, John J.,	Lawrence, Mass.,	1909
Frauer, Herman E.,	Indianapolis, Ind.,	1881
Gallenkamp, Edward W.,	Washington, Mo.,	1903
Galvin, Matthew,	Oglethorpe, Ga.,	1906
Garrett, Oscar N.,	Hillsboro, O.,	1902
Garver, Christian,	Bloomington, Ill.,	1905
Glenn, Oliver Z.,	Denver, Colo.,	1910
Hauenstein, William,	New York, N. Y.,	1883
Hegarty, Charles K.,	Little Rock, Ark.,	1906
Hellstern, Edward,	Ouray, Colo.,	1908
Hunter, Sylvester W.,	Auburn, N. Y.,	1900
Jackson, Frank A.,	Woonsocket, R. I.,	1900
Jones, Harold W.,	Baltimore, Md.,	1909
Koch, Fred C.,	Chicago, Ill.,	1907
Laack, Adolph C.,	Mankato, Minn.,	1909
Landon, Ray I.,	Lawler, Ia.,	1908
Levinson, Joseph,	Napa, Cal.,	1895
Lewis, George Arthur,	Los Angeles, Cal.,	1909
Matson, George H., Jr.,	Columbus, O.,	1896
Maxwell, Hazel,	St. Paul, Minn.,	1900
McCurdy, John A.,	Steelton, Pa.,	1910
McKibben, Robert G.,	Wellsville, Mo.,	1909
McNair, John S.,	Ashland, Ore.,	1900
Merrell, Hubert S.,	St. Louis, Mo.,	1903
Michels, John B.,	El Paso, Ill.,	1909
Napp, William G.,	New Orleans, La.,	1906
Nelson, Burt E.,	Binghamton, N. Y.,	1902
Oetinger, Albert,	Warminster, Pa.,	1902
Porr, William H.,	New York, N. Y.,	1908
Riemenschneider, Julius H.,	Chicago, Ill.,	1906
Russell, Frederick A.,	Tarrytown, N. Y.,	1900
Schleussner, Chas. F.,	New York, N. Y.,	1902
Scholastica, Sister Mary,	Hot Springs, Ark.,	1907
Schulz, Raymond L.,	Madison, Wis.,	1907

LIST OF MEMBERS WHO HAVE DIED SINCE LAST REPORT.

1427

Shurtleff, Wilford C.,	Chicago, Ill.,	1905
Sieling, James,	Pittsburg, Pa.,	1908
Staehle, Louis L.,	Newark, N. J.,	1898
Stein, Edward T. N.,	Jersey City, N. J.,	1902
Stimson, Charlotte E.,	Tiskilwa, Ill.,	1905
Sum, Francis,	St. Louis, Mo.,	1904
Taylor, Chas. D.,	Pass Christian, Miss.,	1909
Von Stein, John H.,	Upper Sandusky, O.,	1904
Walbrach, Arthur,	Denver, Colo.,	1881
Walker, Chas. H.,	Tacoma, Wash.,	1904
Webster, Lloyd H.,	Grafton, Mass.,	1909
Willenbrink, Chas. A.,	Covington, Ky.,	1904
Wilson, Talvus D.,	Corpus Christi, Tex.,	1909
Wright, Chas. L.,	Webb City, Mo.,	1901

LIST OF MEMBERS WHO HAVE DIED SINCE PUBLICATION OF
THE LAST REPORT.

	Residence.	Elected.
<i>Abernethy, Maxwell,</i>	Jersey City, N. J.,	1865
Attfield, John (Hon.),	Watford, Eng.,	1871
Baltzly, Albert B.,	New York, N. Y.,	1907
Bauer, Louis G.,	Philadelphia, Pa.,	1867
Blanchard, W. H.,	Nashua, N. H.,	1910
Brooks, George W.,	Brooklyn, N. Y.,	1879
Candidus, Philip C.,	Mobile, Ala.,	1857
Carteighe, Michael (Hon.),	London, Eng.,	1882
Cormick, John W.,	Dallas, Tex.,	1906
Dohme, Louis,	Baltimore, Md.,	1859
Durban, Sebastian C.,	Augusta, Ga.,	1883
Eliel, Leo,	South Bend, Ind.,	1882
Eysenbach, Henry P.,	Chicago, Ill.,	1905
Forbes, J. Winchell,	Cincinnati, O.,	1905
Gardner, Robert W.,	Bloomfield, N. J.,	1867
Gertler, John H.,	Indianapolis, Ind.,	1905
Haake, William H.,	Cleveland, O.,	1893
Hall, Frank M.,	Denver, Colo.,	1908
Hallberg, Carl S. N.,	Chicago, Ill.,	1879
Heinritz, Herman,	Holyoke, Mass.,	1909
Hiss, A. Emil,	Chicago, Ill.,	1906
King, James T.,	Middletown, N. Y.,	1859
Kleine, Oscar C., Jr.,	Brooklyn, N. Y.,	1903
Lide, Leslie,	Meridian, Miss.,	1909
Mason, Myron T.,	Angel Island, Cal.,	1904
Marion, Etienne J.,	New Orleans, La.,	1903
May, Chas. C.,	St. Louis, Mo.,	1898
McAdams, William J.,	Pittsburg, Pa.,	1908
Niederer, Albert,	Carlstadt, N. J.,	1909
Overbeck, Bernard H., Jr.,	Cincinnati, O.,	1906
Quandt, Ernest E.,	Baltimore, Md.,	1909
Rafter, Michael,	New York, N. Y.,	1908

Sollman, Luitpold,	Canton, O.,	1908
Spalding, W. A.,	New Haven, Conn.,	1876
Webber, Joseph L.,	Brooklyn, N. Y.,	1886
Whipple, George H.,	Bridgeton, N. J.,	1902
Wicks, Otto,	Brooklyn, N. Y.,	1907
Williams, John K.,	Hartford, Conn.,	1875
Workman, Robert,	Seattle, Wash.,	1909

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